REMINGTON®
MODEL 104
CALCULATOR

ADJUSTMENT MANUAL

Remington OFFICE MACHINES
DIVISION OF SPERRY RAND CORPORATION
SPERRY RAND BLDG. - NEW YORK, N.Y. 10019

ADJUSTMENT MANUAL

REMINGTON
MODEL 104 CALCULATOR

Remington OFFICE MACHINES
DIVISION OF SPERRY RAND CORPORATION
SPERRY RAND BUILDING
NEW YORK, N.Y. 10019

DM-229

© 1964 SPERRY RAND CORP.

MODEL 104 CALCULATOR

INSPECTION AND ADJUSTMENTS

REV. OCTOBER 1964

INDEX

Title	Adj. No.
Accumulator Actuator Hook Latch	71
Accumulator Subtract Hook Latch	72
Accumulator Mesh	66
Accumulator Actuator Link Lock Bail Release	74
Accumulator Cradle Arms	67
Add Back	75
Add Back Control	76
Automatic Recall Control	35
Back Space	80
Character Fan	46
Column & Decimal Indicator	84
Correction Key Release Plate	29
Decimal Printing	85
Digit Key Lock Bar Control	16
Digit Key Motor Trip	28C
Digit Key Motor Trip (Spring Housing)	28A, 28B
Digit Key Release	17
Division Escapement Trip	65
Divisor Locator	63
Divisor Unit Control	8
Drive Rack Control Yoke	53
Feature Key Interlock	22
Full Stroke Arm	19, 21
Half Step (Correction & Total Keys)	23D, 23E
Half Step (0,00,000 Keys)	23C
Half Step (Yoke)	23A, 23B
Half Step Yoke Control Limit Link	26
Hooks-Alignment	3
Hooks-Multiply Gears	60
List Unit Actuator Hook Control (Mult. & Div.)	61
List Unit Mesh	15
List Unit Escapement Finger	10, 25, 65B
List Unit Gear Alignment	11
List Unit Input Shaft	12
List Unit Up Limit	9
List Unit Reset Segment	18
List Unit Spring Housing	28A, 28B
List Unit Control Shaft	62
Locator Wheel	13
Multiply Unit	2
Multiply Unit Latch	4
Multiply Counter	7, 14, 65C
Multiply Counter Segment (Slide #1 & #3)	56
M & D Drive Plunger	39
M & D Lift Arm (Slide #3 Alignment)	52

M & Q Bridge 38A
M & Q Bridge (Overthrow Stop) 38B
Motor Positioning 27
Motor Trip Arm 20
Non Add 59
Paper Cutter 86
Platen Height 40
Platen Feed 41
Platen Feed Arm 37
Rack Drive Mechanism 1
Rack Aligner 5
Rack Rebound Plate 77
Recall Unit 33
Recall Unit Control 34, 35
Recall Unit (Limit Stud) 32
Recall Unit Mesh 31
Recall & Storage Control 36
Recall Control (Multiply) 36
Ribbon Feed 44
Ribbon Reverse Shaft Detent 42
Ribbon Reverse Lift Limits 43
Ribbon Reverse 45
Slide #1 Alignment 64
Slide #3 Alignment 52
Slide #1 & #2 Action 64
Slide #1 & #3 Action 56
Slide #4 Alignment 54
Slide #4 Action 55
Slide #5 Alignment 57
Slide Normalizers (#1 Slide) 51
Slip Clutch Adjustment 83
Speed (Low) (Printing) 81
Speed (High) 82
Stop Key 58
Seventeenth Column Lock & Limit 78, 79
Subtract Control Bail 73
Storage Control Shaft 36
Total Bail Control 68, 69, 70
Total Bail Control Stop 70
Total Key Half Step Bail 24
Type Firing Plate & Platen Feed Arm 37
Type Guide Comb 30
Universal Cam Shaft Detent 50
Universal Cam Shaft Drive 6,47, 48, 49

USE OF POWER DURING ADJUSTMENT PROCEDURE

Power should not be used when making adjustments other than the following to avoid machine damage:

1. Adjustments 21, 28B, 28C, 82A, 82B, 83 - necessary to use power.

2. Adjustment 30 - the 16 digits can be entered using power - check and make adjustment without power. After this adjustment is made, the first digit entry, particularly numeral "1", is to be checked under power for stickiness. Fast entry of all Digit Keys is also checked under power at this point. Following this step in adjustment procedure, digit entries necessary to particular adjustments may be made under power.

3. Adjustment 45 - set manually - recheck and refine after adjustment 65 using power.

4. Adjustments 80A, 80B and 81A, 81B - set manually - recheck and refine using power.

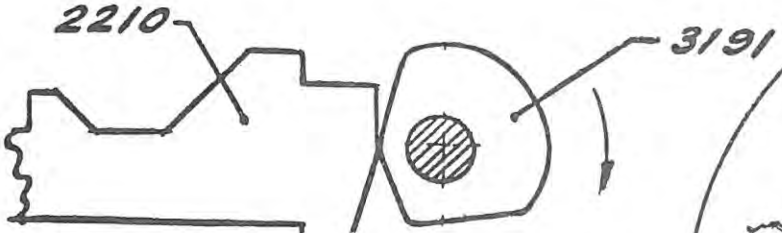
5. After adjustment 65, and before the Accumulator is installed, check the machine to run under power. Function Keys - Add, Subtract, Sub-total, Total, Mult, Division, Stop and Correction are to be used.

If the adjustments are made to specifications, the machine should be capable of full power operation at the end of the adjustment procedure.

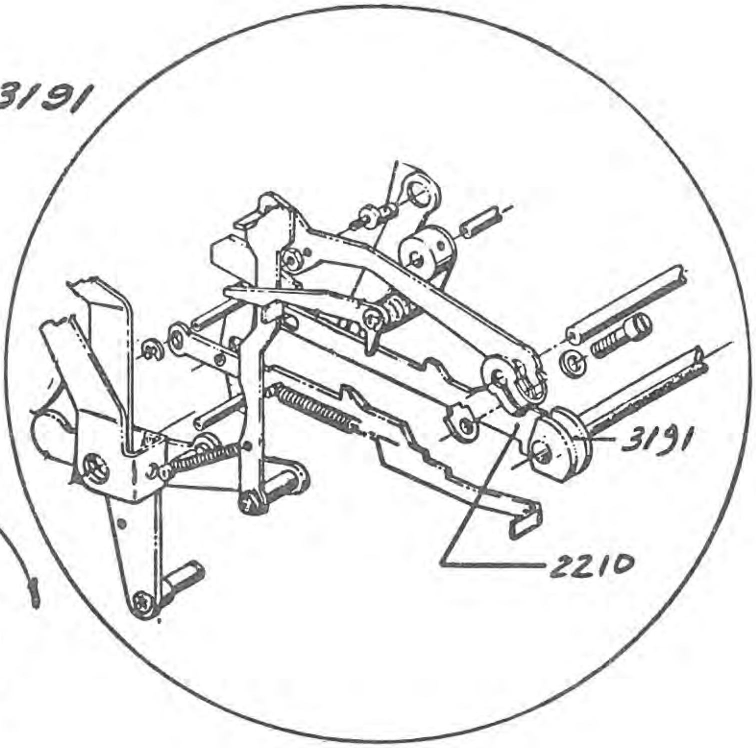
ASSEMBLY CHECK - BEFORE AND DURING ADJUSTMENT PROCEDURE

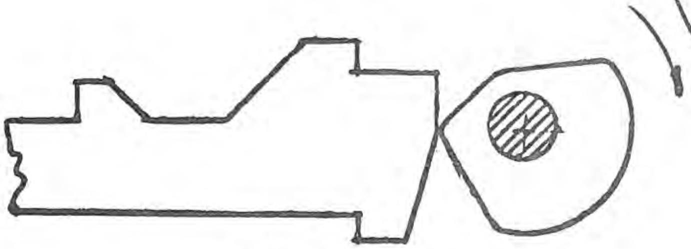
1. Cam and cam followers fully align.
2. Slides, pivoting parts and gears free.
3. Screws and nuts tight.
4. Springs hooked properly and not damaged.
5. Retainers in place.

UNIVERSAL CAM SHAFT POSITIONS - MODEL 104

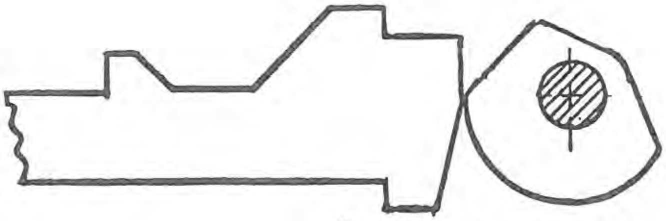


'E' POSITION (NORMAL)

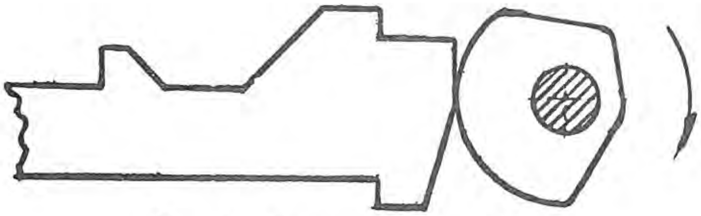




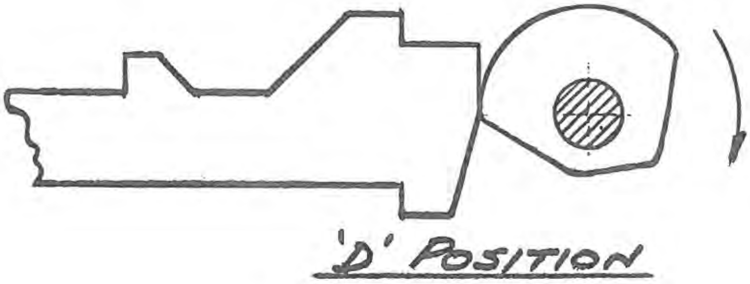
'A' POSITION



'B' POSITION



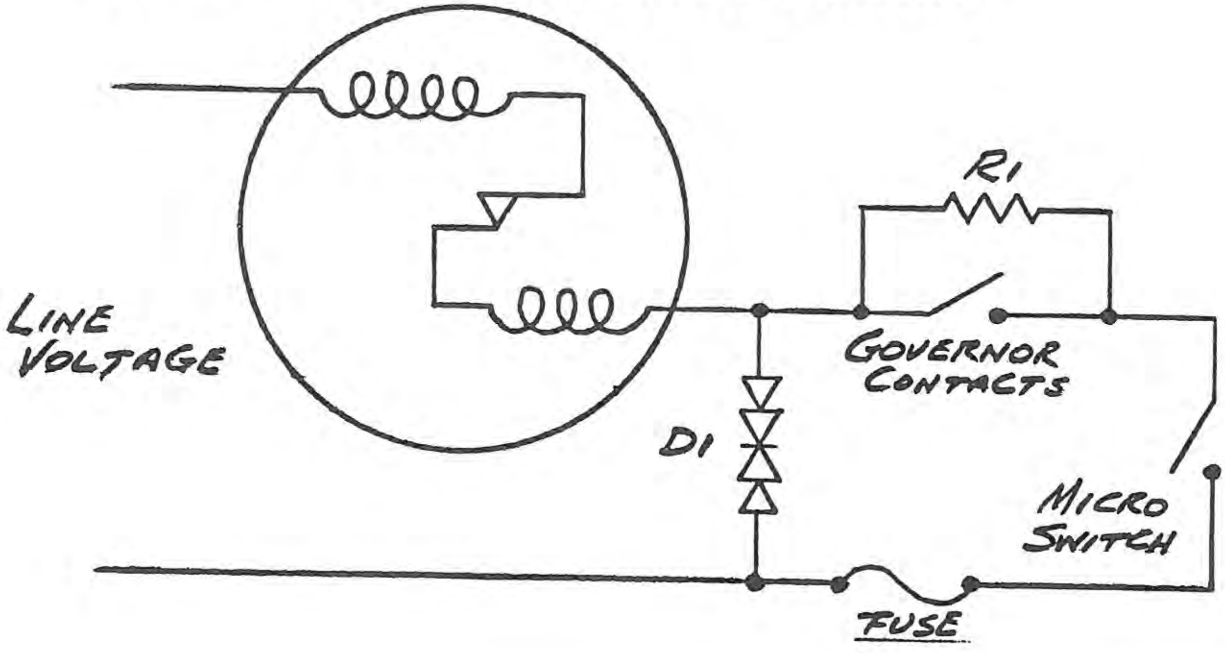
'C' POSITION



'D' POSITION

SCHEMATIC WIRING DIAGRAM

SERIES WOUND UNIVERSAL MOTOR



R1 250 OHMS 50 WATT WIRE WOUND
D1 ITT SELENIUM RECTIFIER
LITTEL FUSE 3AG 1¼ AMP. SLO-BLO

MODEL 104

1. RACK DRIVE MECHANISM

a) The restored (forward) position of the Rack Reset Shaft 28-3108 shall be 1.024 ± .002 from the front of the Front Plate to the rear edge of the Reset Shaft when the Front Roll is against the Cam (2219).

Vernier calipers may be used to obtain this setting or a gauge could be made for assembly use.

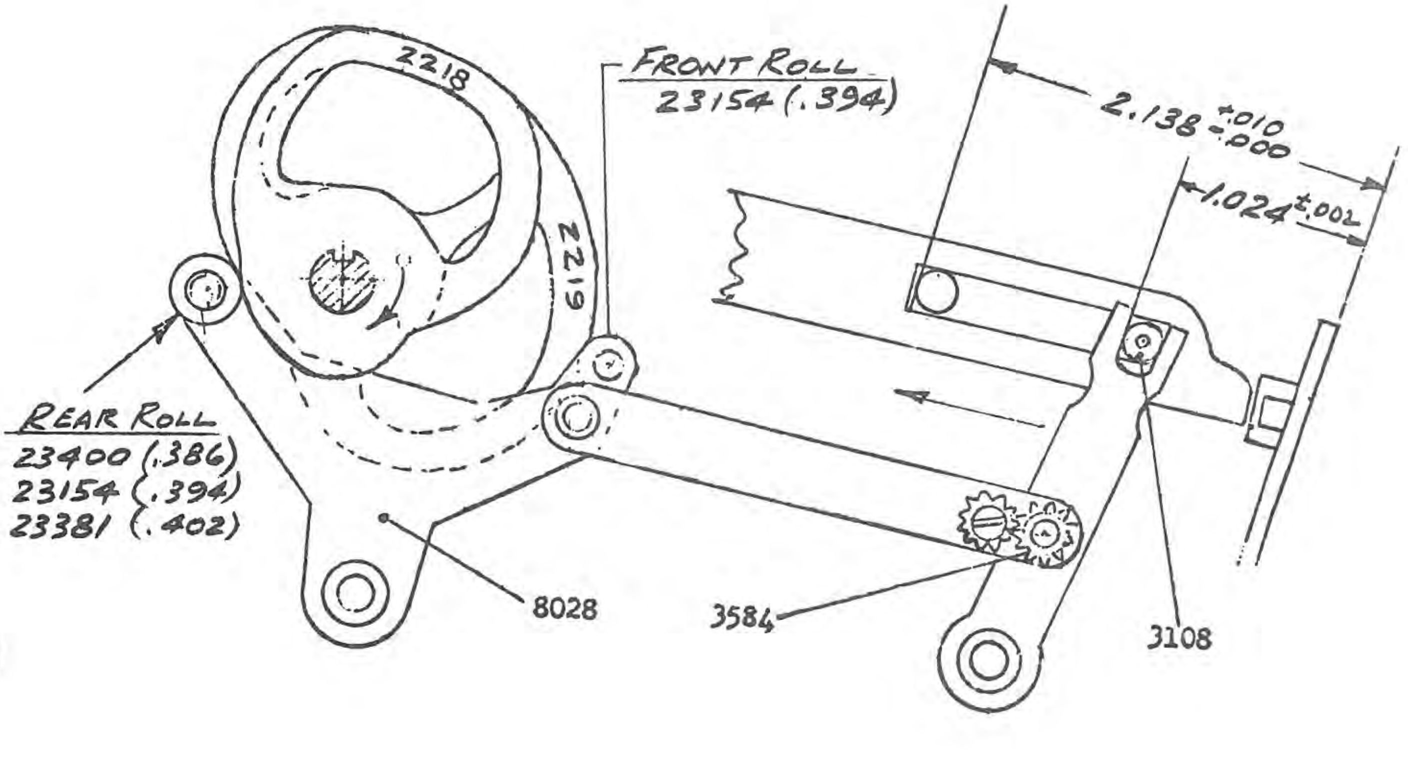
Measurement is to be taken at the left end of the Shaft outside and as close to the Left Center Frame as possible.

Adjust by means of Rack Reset Eccentric Bushing (3584).

b) The rear position of the Rack Reset Shaft shall be 2.138 + .010 -.000 from the front of the Front Plate to the rear edge of the Reset Shaft when the Rear Roll is against the Cam 2218. Measurement is taken at same point as in Adj. 1A.

Adjust by changing Rear Roll of Rack Reset Bell Crank (8028).

The 1.024 and 2.138 dimensions are with Front Plate and Center Frames flush. If there is an observable gap between the Front Plate and the Left Center Frame, the gap measurement must be added to the setting dimensions to obtain the caliper reading for correct Shaft setting (eg. .005 gap +1.024 = 1.029 = required caliper reading).

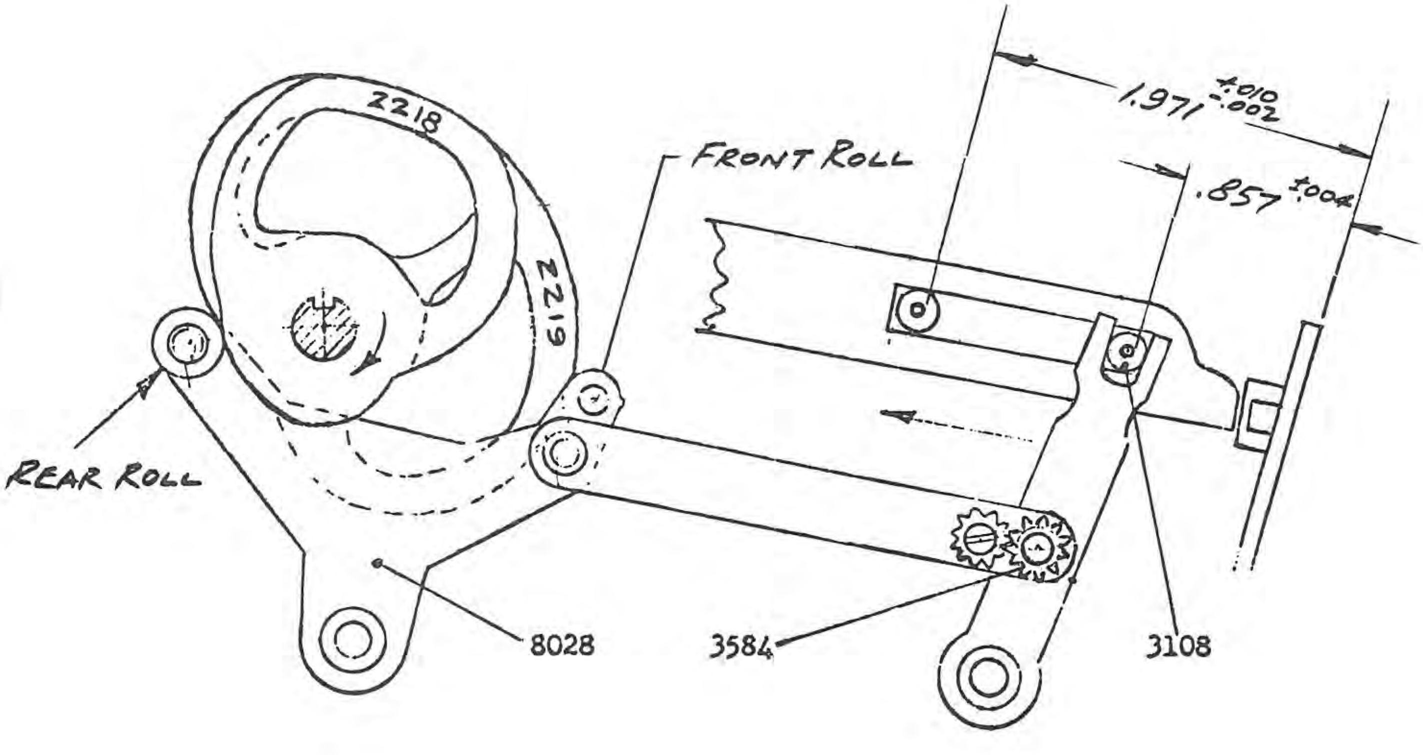


1. RACK DRIVE MECHANISM

c) To check Shaft Position on assembled machines, measurement is made by inserting the depth gauge probe of the caliper through the small rectangular hole in the Front Plate to the left of the Left Center Frame. Reading is taken to the forward edge of the small turned diameter on the left end of the Reset Shaft.

The measurement is .857 ± .004 from the front of the front plate for the forward position and 1.971 +.010 -.002 for the rear position.

NOTE: Measure with Front Roll against Cam (2219) for forward position check and Rear Roll against Cam (2218) for rear position check.

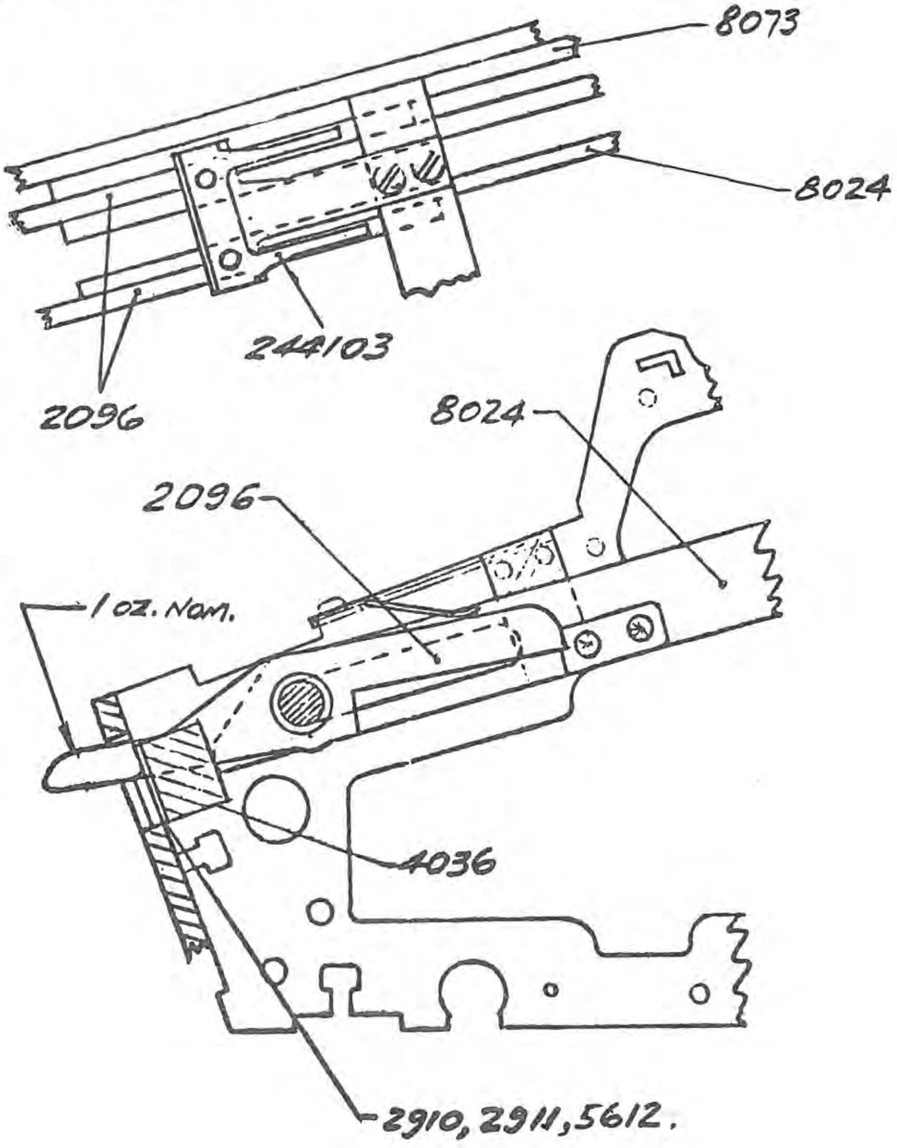


1. RACK DRIVE MECHANISM

d) The Multiply and Accumulator Total Drive Racks (8073) and (8024) should limit against the Nylon Bumper (4036) at the front with only sufficient pressure to eliminate shake when the Main Shaft is normal. Use Shim (2910, 2911 and 5612) to adjust Bumper.

e) Check to see that the Total and Multiply Rack Actuator Fingers (2096) are free to drop in front of the lugs on the Racks and clear the top of lugs when the front end of the Fingers (2096) are held down. The Spring (244103) must be aligned with the Fingers (2096) and clear the Drive Racks. Be sure that the Spring has sufficient tension on Fingers (1 oz nom.). Check to see that none of the Transfer Racks (2921) are pressing against the Bumper.

(Adjustment to be made prior to mounting of Key board on machine)



1. RACK DRIVE MECHANISM

a) The restored (forward) position of the Rack Reset Shaft (28-3108) shall be 1.024 ± .002 from the front of the Front Plate to the rear edge of the Reset Shaft when the Front Roll is against the Cam (2219).

Vernier calipers may be used to obtain this setting or a gauge could be made for assembly use.

Measurement is to be taken at the left end of the Shaft outside and as close to the Left Center Frame as possible.

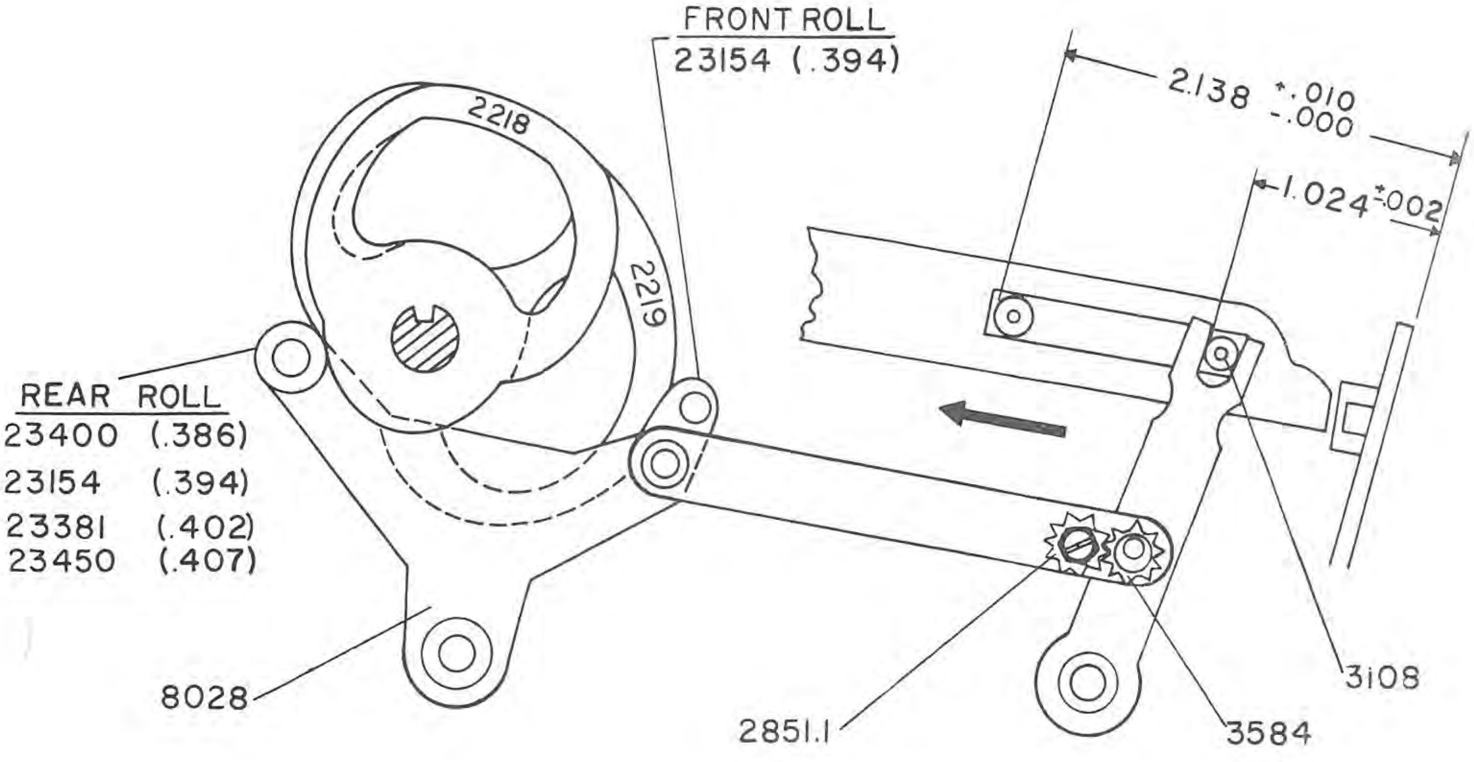
Adjust by means of Rack Reset Eccentric Bushing (3584).

Hold Star Gear (2851.1) securely against Eccentric Bushing (3584) to remove backlash, and lock in place.

b) The rear position of the Rack Reset Shaft shall be 2.138 +.010 -.000 from the front of the Front Plate to the rear edge of the Reset Shaft when the Rear Roll is against the Cam (2218). Measurement is taken at same point as in Adjustment (1a).

Adjust by changing Rear Roll of Rack Reset Bellcrank (8028).

The 1.024 and 2.138 dimensions are with Front Plate and Center Frames flush. If there is an observable gap between the Front Plate and the Left Center Frame, the gap measurement must be added to the setting dimensions to obtain the caliper reading for correct shaft setting (e.g. .005 gap + 1.024 = 1.029 = required caliper reading).



1. RACK DRIVE MECHANISM

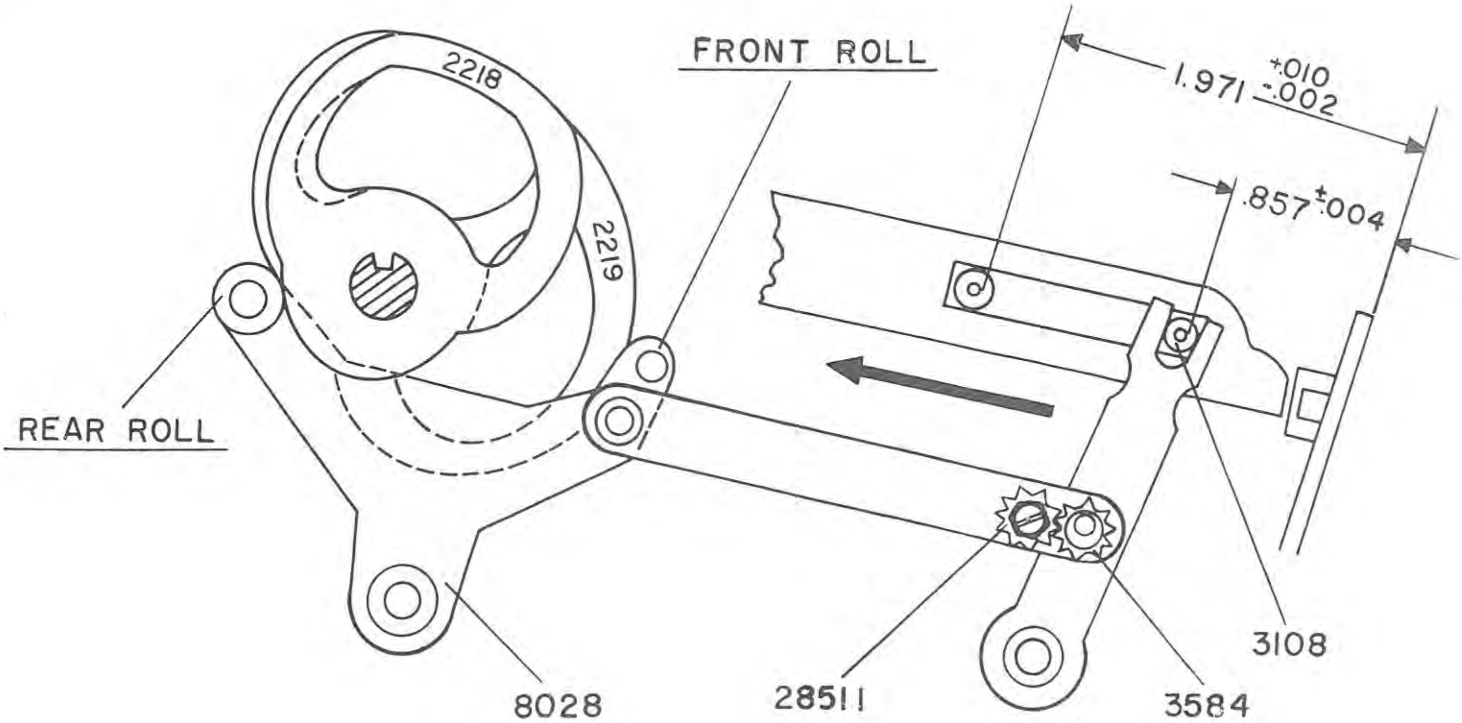
c) To check Shaft Position on assembled machines, measurement is made by inserting the depth gauge probe of the caliper through the small rectangular hole in the Front Plate to the left of the Left Center Frame. Reading is taken to the forward edge of the small turned diameter on the left end of the Reset Shaft.

The measurement is .857 ± .004 from the front of the front plate for the forward position and 1.971 + .010 -.002 for the rear position.

Adjust by means of Rack Reset Eccentric Bushing (3584).

Hold Star Gear (2851.1) securely against Eccentric Bushing (3584) to remove backlash, and lock in place.

NOTE: Measure with Front Roll against Cam (2219) for forward position check and Rear Roll against Cam (2218) for rear position check.



2. MULTIPLY UNIT

Check the Multiply Unit to be free with a max. of .004 side play - always use a Shim (23392, 23393 or 23394). This check is made with a dummy top plate aligning the frames correctly. For correct orientation of the Multiply Drive Gear (2863) - see below.

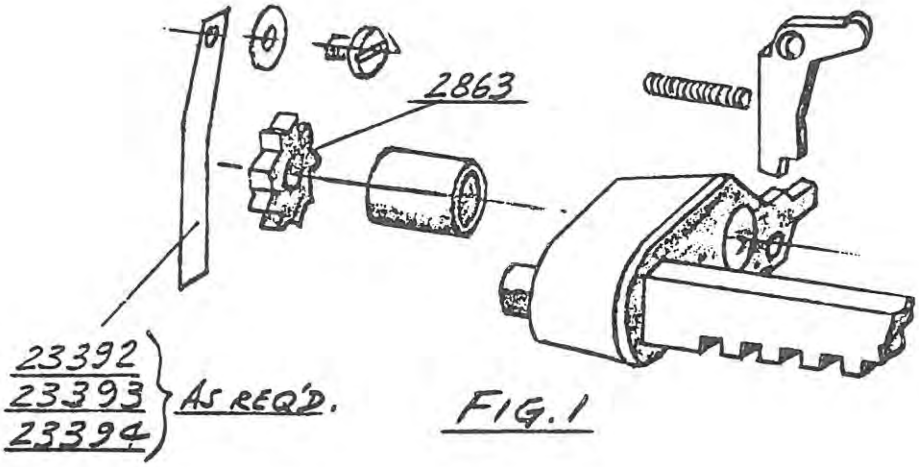
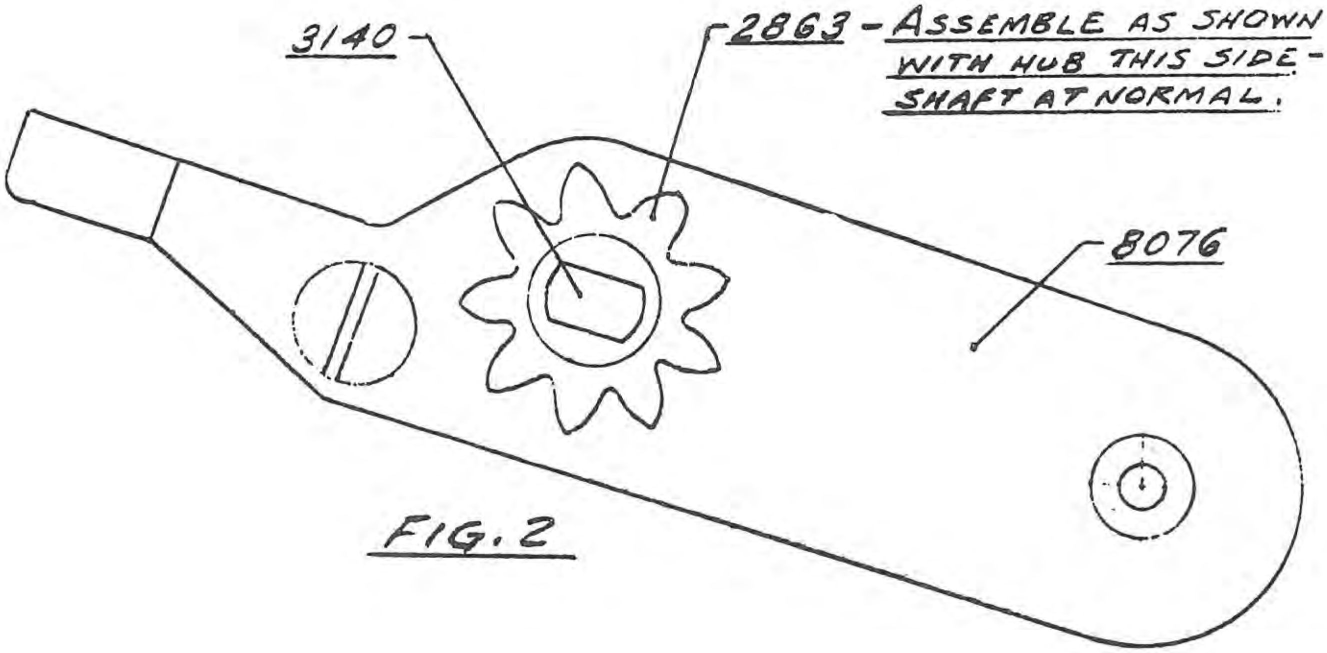


FIG. 1

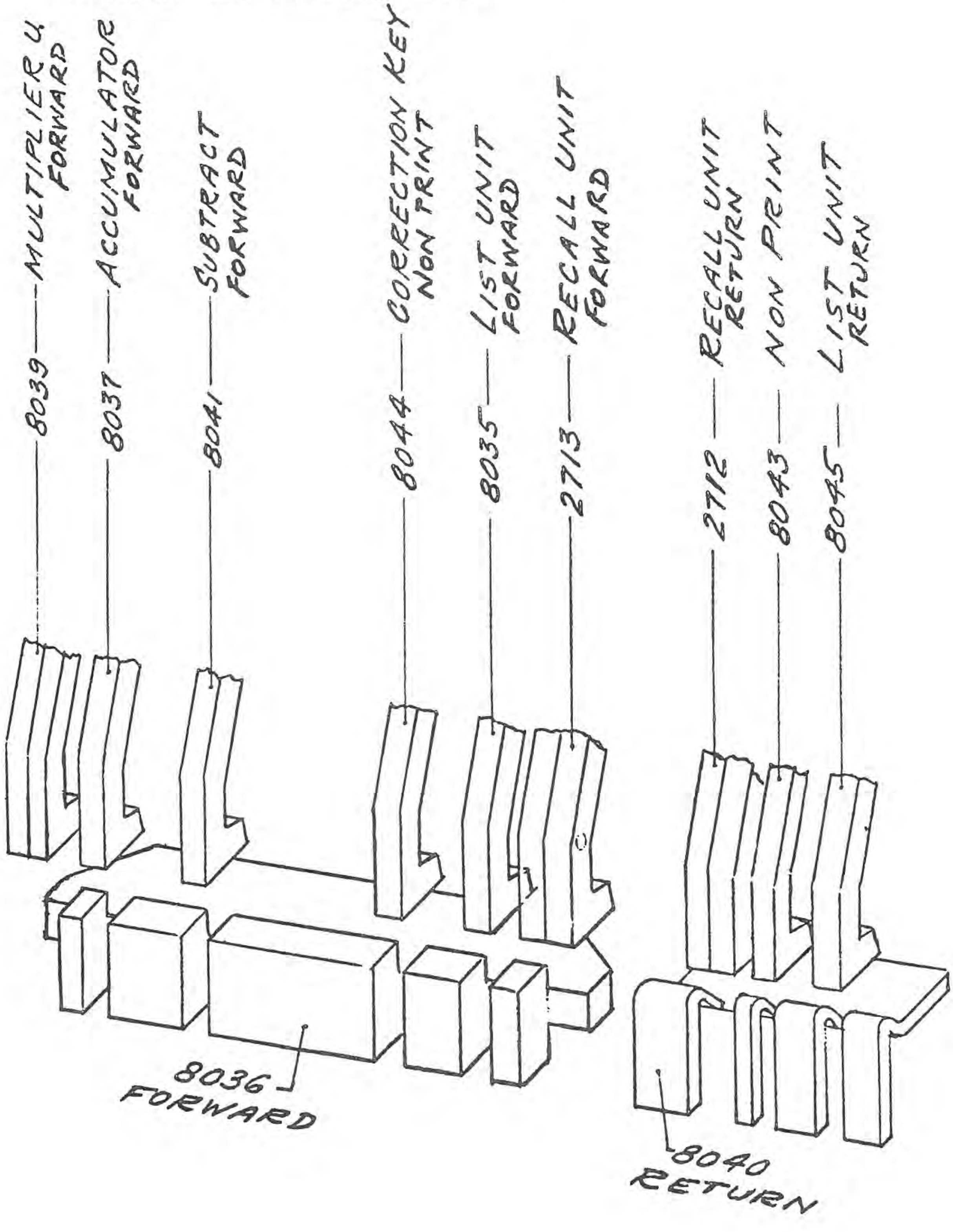


2863 - ASSEMBLE AS SHOWN WITH HUB THIS SIDE - SHAFT AT NORMAL.

FIG. 2

3. ACTUATOR HOOKS ALIGNMENT

With a dummy top plate still in place and by holding the Actuator Hooks, first to the right and then to the left, see that they are free in the slots of the Forward Stroke and Return Stroke Actuator Bars (8036) and (8040). Also check to see that the Hooks are free to engage and disengage Bars.


8039 — MULTIPLIER & FORWARD
8037 — ACCUMULATOR FORWARD
8041 — SUBTRACT FORWARD
8044 — CORRECTION KEY NON PRINT
8035 — LIST UNIT FORWARD
2713 — RECALL UNIT FORWARD
2712 — RECALL UNIT RETURN
8043 — NON PRINT
8045 — LIST UNIT RETURN
8036 FORWARD
8040 RETURN

4. MULTIPLY UNIT LATCH

a) Select a Multiply Unit Latch (22007, 22008 or 22012) to give .010 - .015 clearance between the latch and the Multiply Unit with the Multiply Unit fully engaged (Ref. Fig. 1).

b) Engage the Multiply Hook (8039) with the Forward Stroke Actuator Bar (8036), turn the Main Shaft and see that the Multiply Unit meshes snugly without binding. Adjust by repositioning the Multiply Actuator Hook Connector Hook Assembly (8414) in the Multiply Actuator Hook Assembly (9806). (Ref. Figure 2)

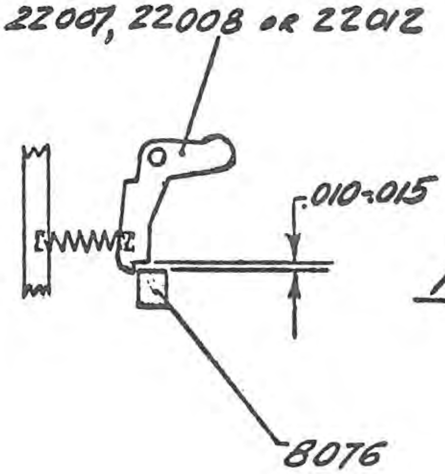


FIG. 1

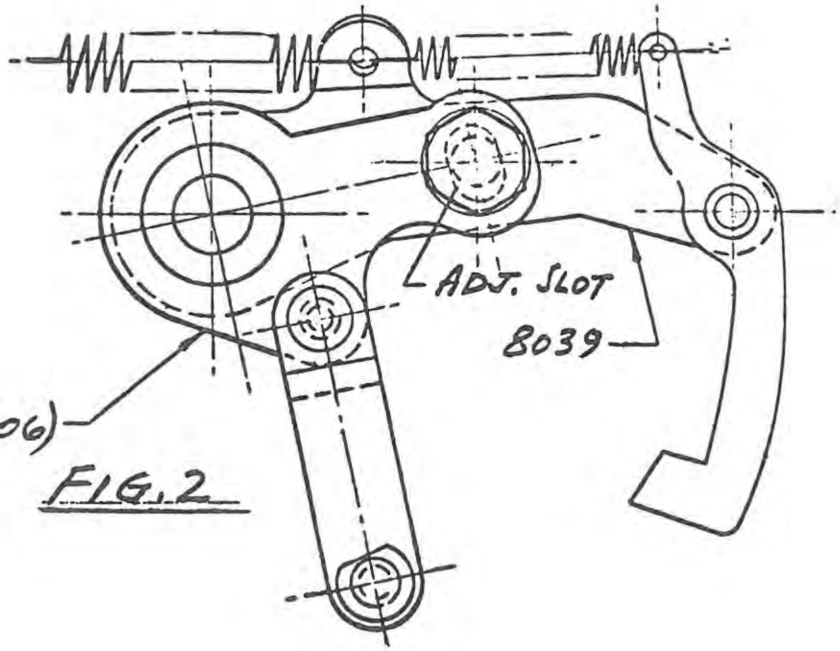


FIG. 2

4. MULTIPLY UNIT LATCH

a. Figure (1) - Select a Multiply Unit Latch (22007), (22008) or (22012) to give .010 - .015 clearance between the latch and the multiply unit with the multiply unit fully engaged.

b. Figure (2) - Engage the Multiply Hook (8039) with the Forward Stroke Actuator Bar (8036). Turn the main shaft and check the multiply unit to mesh snugly with the transfer racks and multiply drive rack without binding or forcing against the racks.

Adjust by repositioning the Multiply Actuator Hook Connector Hook Assembly (8414) in the Multiply Actuator Hook Assembly (9806).

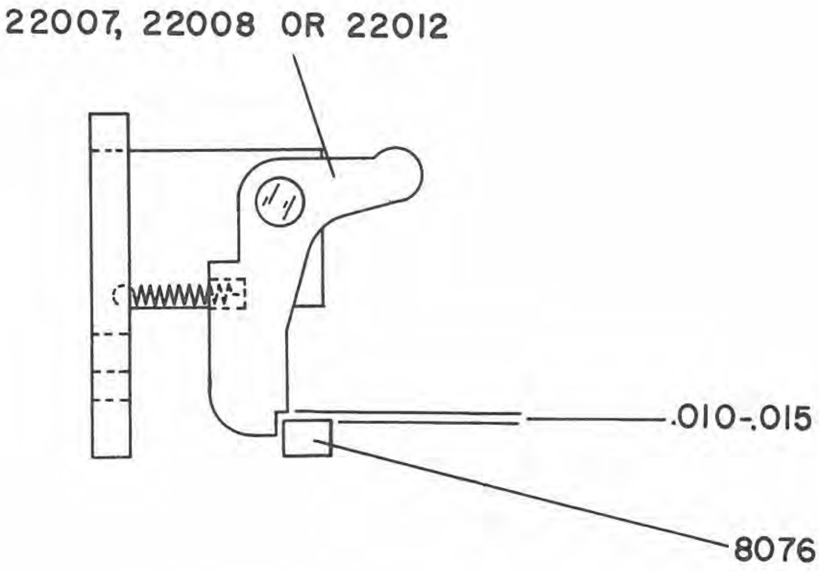


FIG. 1

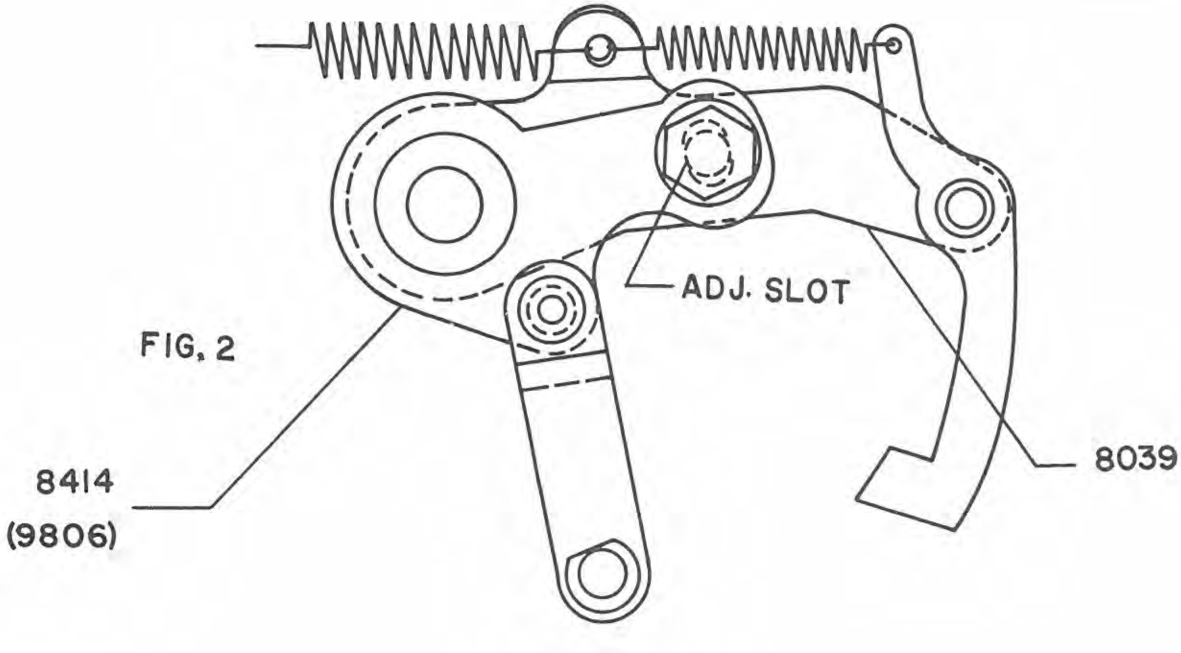


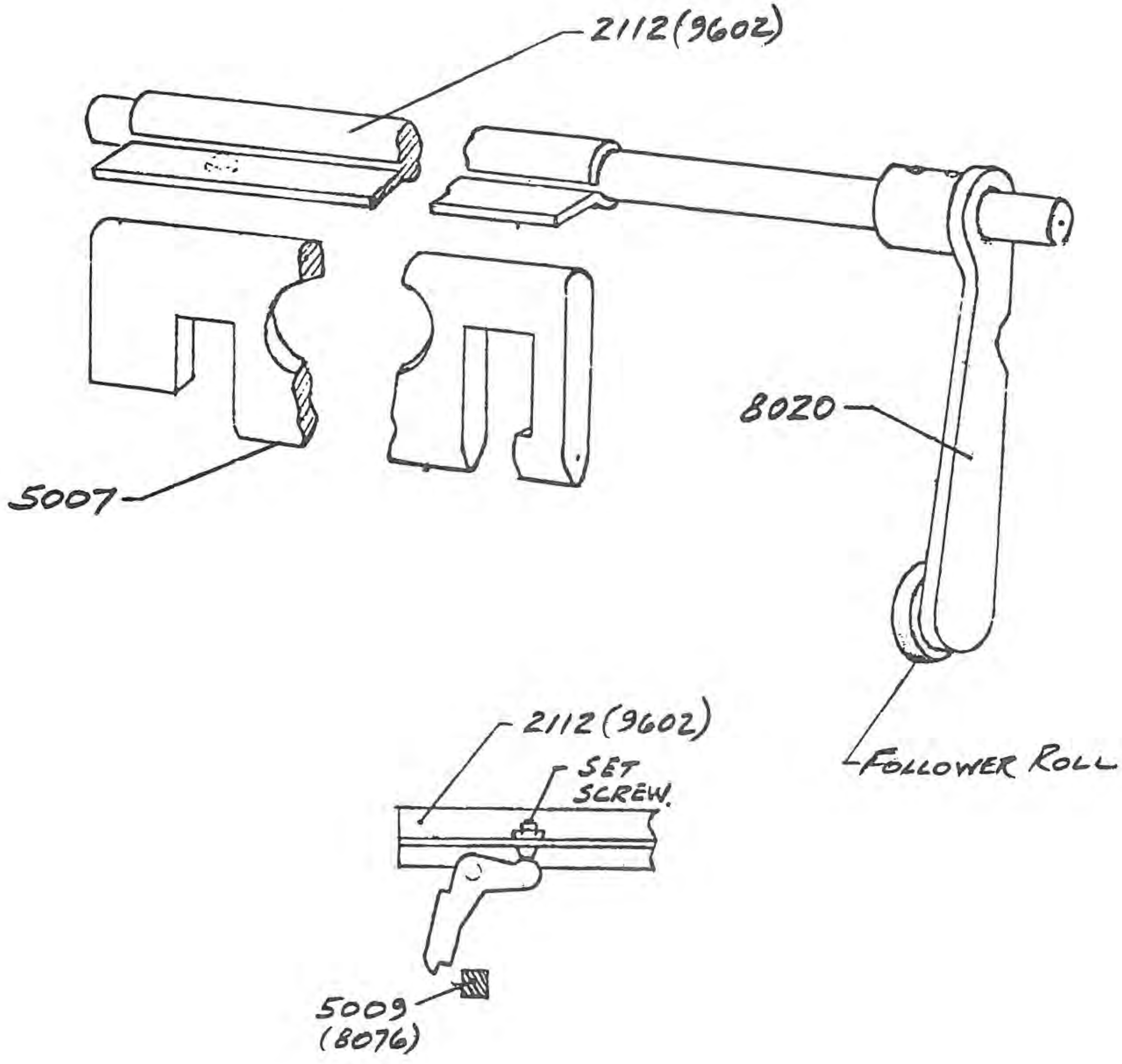
FIG. 2

5. RACK ALIGNER

a) As the Main Shaft is turned, push down on the Rack Aligning Blade Control Bar (2112) in Assembly (9602) and see that the Cam does not force the Control Bar (2112) any further after the Rack Blade (5007) reaches a seated position in the racks. (Must be snug but not straining the parts.) Adjust by forming the Rack Blade Control Arm (8020). (Use tools ST-2000250 and ST-2000251.)

NOTE: Follower Roll on Control Arm (8020) must not be changed.

b) Push the Multiply Unit down until latched. Rotate the Main Shaft and as the Multiply Unit is released, visually check for .005-.015 further downward movement on the Rack Aligning Blade Control (2112) in Assembly (9602) as the rotation of the Main Shaft is continued. Adjust through the set screw on the Control Bar (2112) in Assembly (9602).



5. RACK ALIGNER

a. Figure (1) - The Rack Aligning Blade Control Bar (178497) in Assembly (178500) must seat the Rack Blade (5007) snugly in the transfer racks without straining any of the parts.

Check by pushing down on the Control Bar (178497). There should be a slight movement (not more than .010) of the follower roll of Rack Blade Control Arm (8020) away from the cam.

Adjust by forming the Rack Blade Control Arm (8020). (Use tools ST-2000250 and ST-2000251).

b. Figure (2) - Push the multiply unit down until latched. Rotate the main shaft and, as the multiply unit is released, visually check for .005 - .015 further downward movement of the Rack Aligning Blade Control Bar (178497) as the main shaft rotation is continued.

Adjust by means of the set screw on the Control Bar (178497) in Assembly (178500).

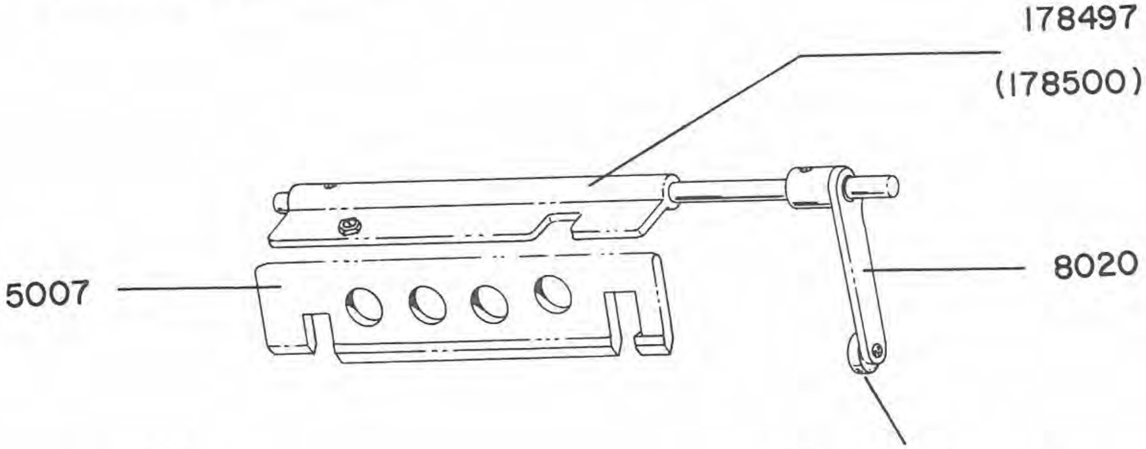


FIG. 1

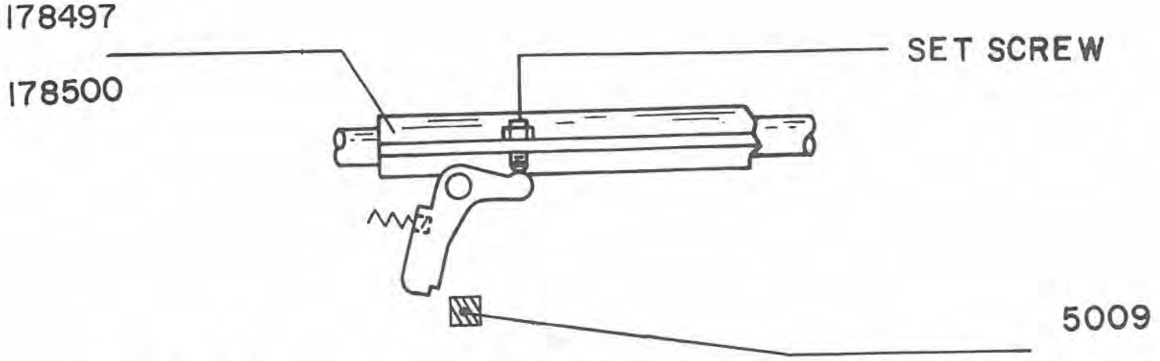
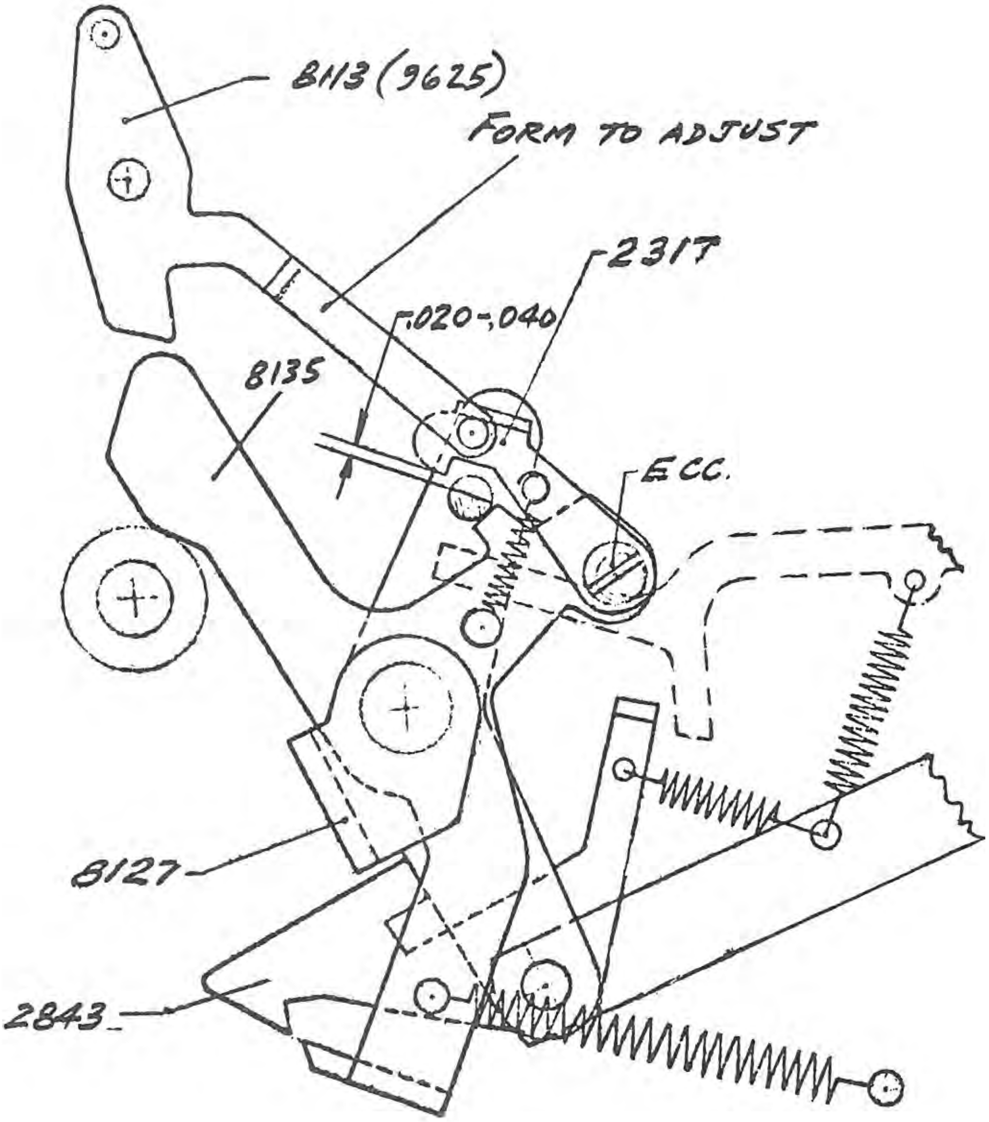


FIG. 2

6. UNIVERSAL CAM SHAFT DRIVE

a) Check to see that when the Universal Cam Auxiliary Feed Drive Latch (2317) is latched on the Stud of the Universal Cam Segment Drive Link Assembly (8127), the Universal Cam Segment Drive Hook (2843) has no play against the lower foot of Universal Cam Shaft Auxiliary Feed Latch Link (8135). Adjust by the Eccentric Screw in the Universal Cam Auxiliary Feed Drive Latch (2317).

b) With the machine normal, there should be .020 - .040 clearance between the Universal Cam Auxiliary Feed Drive Latch (2317) and the stud on the Universal Cam Segment Drive Link (8127). Adjust by forming the 'U' Cam Shaft Auxiliary Control (8113).



6. UNIVERSAL CAM SHAFT DRIVE

A) DEPRESS THE ADD BAR. ROTATE THE AUXILIARY CONTROL (8113) UNTIL LATCHED. PUSH THE LOWER FOOT ON THE AUXILIARY FEED LATCH LINK (8135) REARWARD UNTIL THE AUXILIARY FEED DRIVE LATCH (2317) JUST CONTACTS THE STUD ON THE DRIVE LINK ASSEMBLY (8127) (REF. B). PULL THE DRIVE HOOK (2843) DOWN IN FRONT OF THE LATCH LINK (8135).

THERE MUST BE NO PLAY BETWEEN THE HOOK (2843) AND THE LATCH LINK (8135) (REF. A).

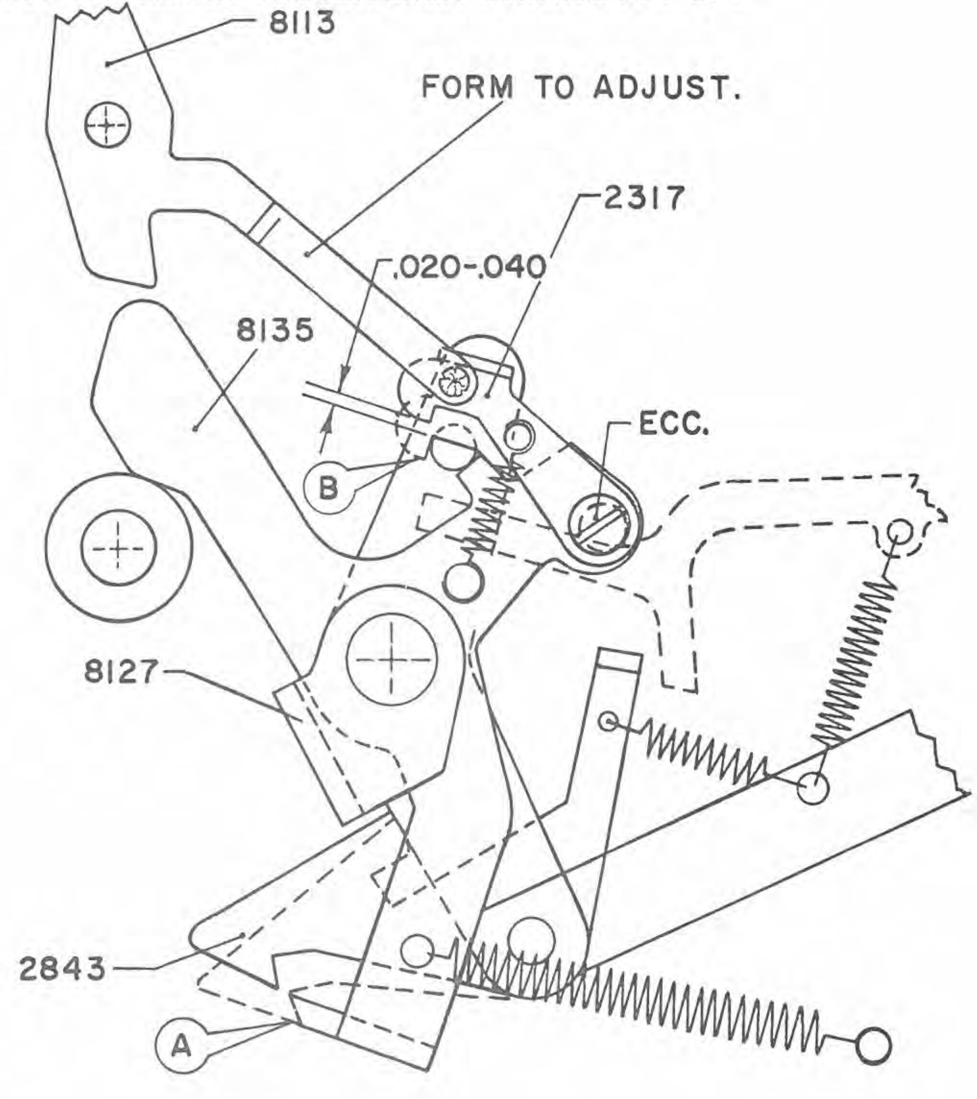
ADJUST BY MEANS OF THE ECCENTRIC SCREW ON THE DRIVE LATCH (2317).

THIS CHECK AND ADJUSTMENT SHOULD BE MADE TO ASSURE THAT THE UNIVERSAL CAM SHAFT DRIVE IS THE SAME IN BOTH CONDITIONS - DRIVE LATCH ENGAGED OR DRIVE HOOK ENGAGED.

B) ROTATE THE MAIN SHAFT 90° TO POSITION THE LATCH POINT OF THE AUXILIARY FEED DRIVE LATCH (2317) OVER THE STUD ON THE DRIVE LINK (8127).

THERE MUST BE .020 TO .040 CLEARANCE BETWEEN THE LATCH AND THE STUD.

ADJUST BY FORMING THE AUXILIARY CONTROL (8113).



7. MULTIPLY COUNTER

The Multiply Counter Connector (8126) must clear the teeth of the Multiply Counter Connector Rack (2798) by .010 to .020. (Check both ends) (Ref. Fig. 1). Adjust by means of the Eccentric Stud (3404) for the Multiply Counter Control Yoke (8140) at the left end of the Divisor Unit Control Assembly (9819) (Ref. Fig. 2). The Connector (8126) and the Control Assembly (9819) must not bind when operated by second depression of the Multiply or Division keys or by Decimal Key after first depression of the Multiply or Division Keys.

NOTE: If this adjustment is changed, recheck Adj. 8.

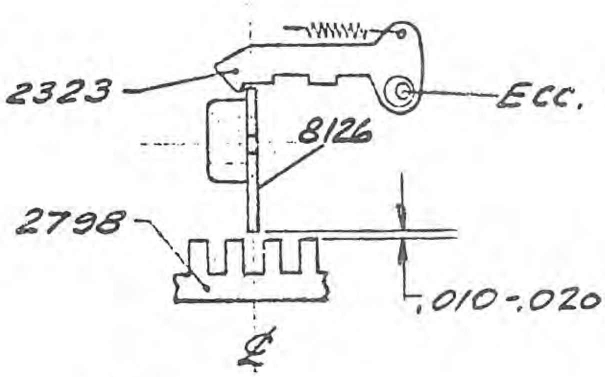


FIG. 1

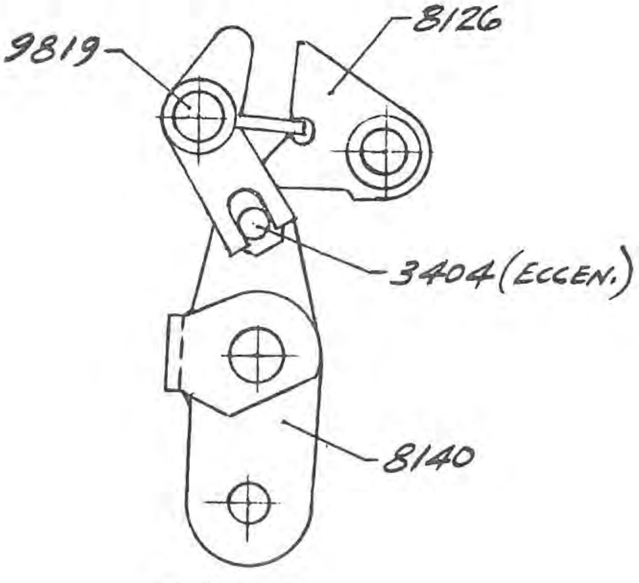


FIG. 2

8. DIVISOR UNIT CONTROL

a) Check to see that the Divisor Unit Column Control Latch (2319), when in normal position, just touches the Divisor Unit Control Finger (8156) and the pin in the shaft at the same time (Ref. A, B, Fig. 1). Form the tail of the Divisor Unit Column Control Latch (2319) to adjust. (Ref. A, Fig. 1)

b) Move the Units Transfer Rack to the rear and see that the Divisor Unit Control Finger (8156) latches under the Divisor Unit Column Control Latch (2319) securely. Adjust by forming the lip on the Latch (2319). (Ref. B, Fig. 2). (The Divisor Unit Control Finger (8156) must be free to drop into the notch in the Unit Column Divisor Control Rack (2137) without binding against the adjacent Racks.)

NOTE: If Adj. 7 is changed, recheck this adjustment.

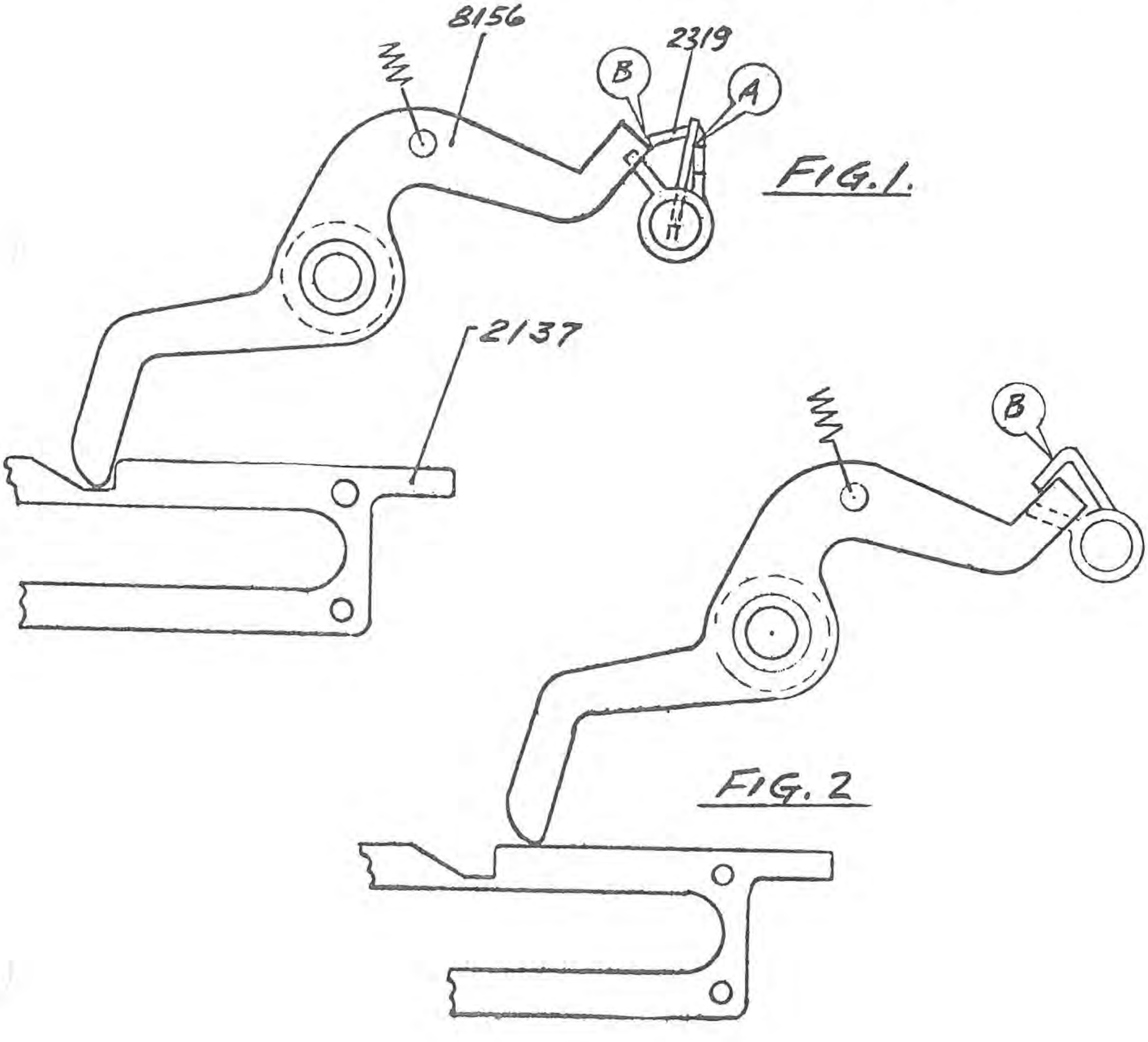


FIG. 1.

FIG. 2

9. LIST UNIT UP LIMIT

With the List Unit clear, check for at least .005 play between the Gears (3008) and the List Unit Upper Lock Plate (2078). (Ref. Fig. 1)

With figures in the List Unit the play should not exceed .035.

Adjust by means of the List Unit Uplift Limit Plate (2095) on the List Unit Support Plate (8022) (Ref. Fig. 2).

NOTE: Be sure that the List Unit Control (Input) Shaft (9213) turns freely.

Check gear clearances entire length of Lock Plate (2078). The List Unit must slide freely.

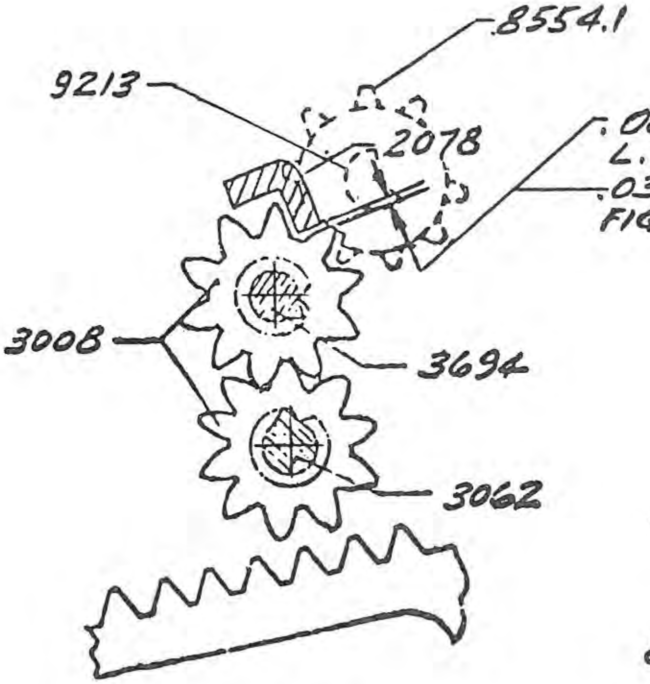


FIG. 1

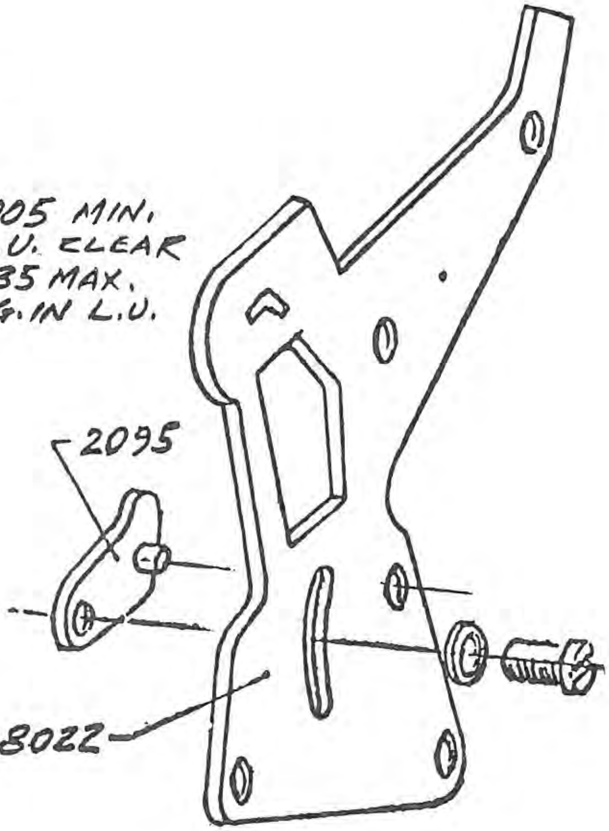


FIG. 2

9. LIST UNIT UP LIMIT

Play in Up Limit Rail (2078.1) must not exceed .005. To correct excess play, peen lower end of the Up Limit Rail where it locates in the List Unit Support Plate (187559) (Ref. Fig. 2).

With the list unit clear and up limit rail held up to remove play, there should be not more than .005 - .015 play between the Gears (3008) and the List Unit Up Limit Rail (2078.1). The list unit must slide freely for its full travel. Check gear clearances entire length of up limit rail.

The Digit Keyboard must not be disabled by fast touch operation of the digit keys.

The play should not exceed .035 with figures in the list unit. This condition will normally be met if the setting above is correct.

Adjust by means of the List Unit Uplift Limit Plate (2095) on the List Unit Support Plate (187559) (Ref. Fig. 2).

Be sure that the List Unit Control (Input) Shaft (9213) turns freely.

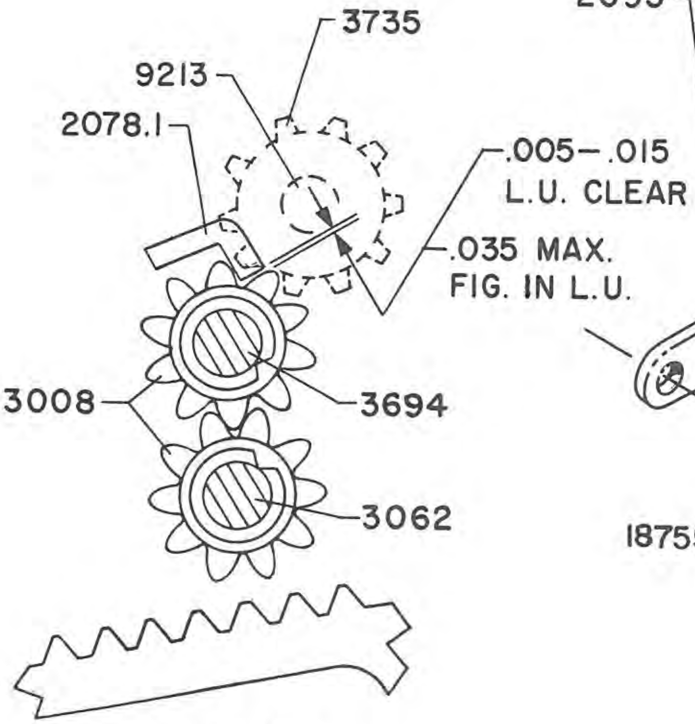


FIGURE 1

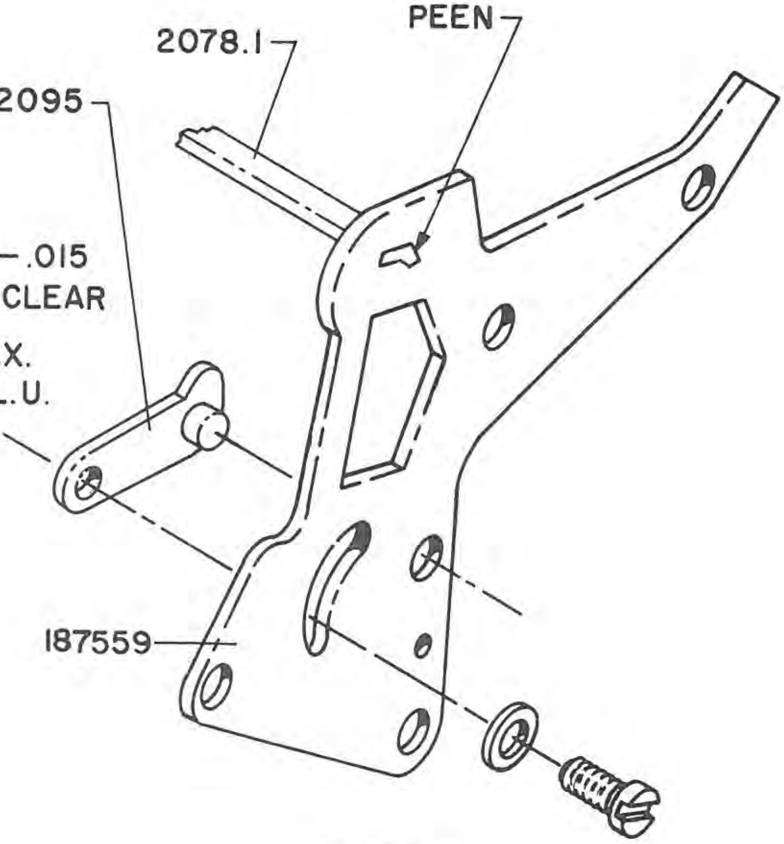


FIGURE 2

10. LIST UNIT ESCAPEMENT FINGER

a) With the Escapement Finger (8503) pushed to the left, check the clearance between it and the Right Escapement Shaft Support Arm (8469) to be .008-.014. (Ref. A. Fig. 1). Adjust with Keyboard Shims (2917, 2918 and 2991) on the left end of the Escapement Shaft (3636).

b) Check end play of the Escapement Shaft (3636) to be .002-.005. Use Washer (M-71422), if necessary, at the left end of Shaft between the Retainer and the Left List Unit Control Shaft Bracket (2495) (Ref. B. Fig. 1).

NOTE: Before assembly of the Top Plate to the machine check for .002-.007 clearance between the Back Space Pawl (8167) and the List Unit Double Reset Gear (3148). Form the Pawl to adjust (Ref. A. Fig. 2).

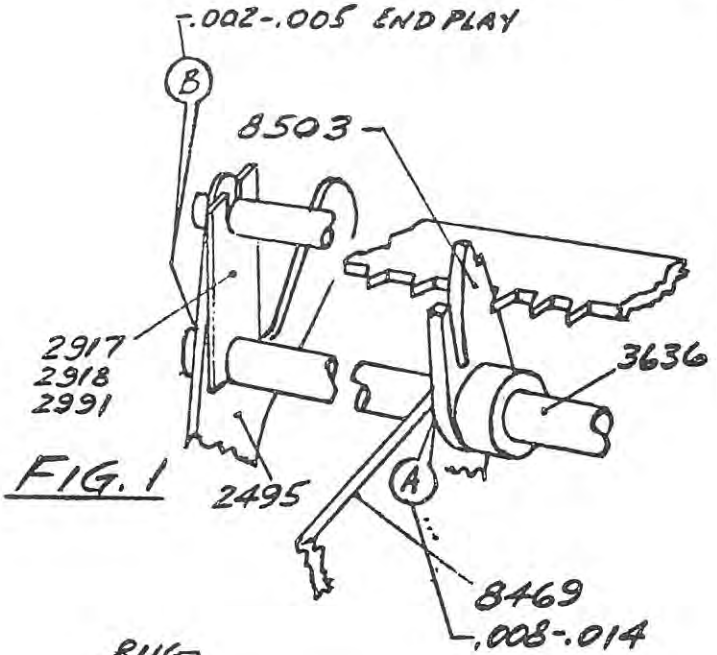


FIG. 1

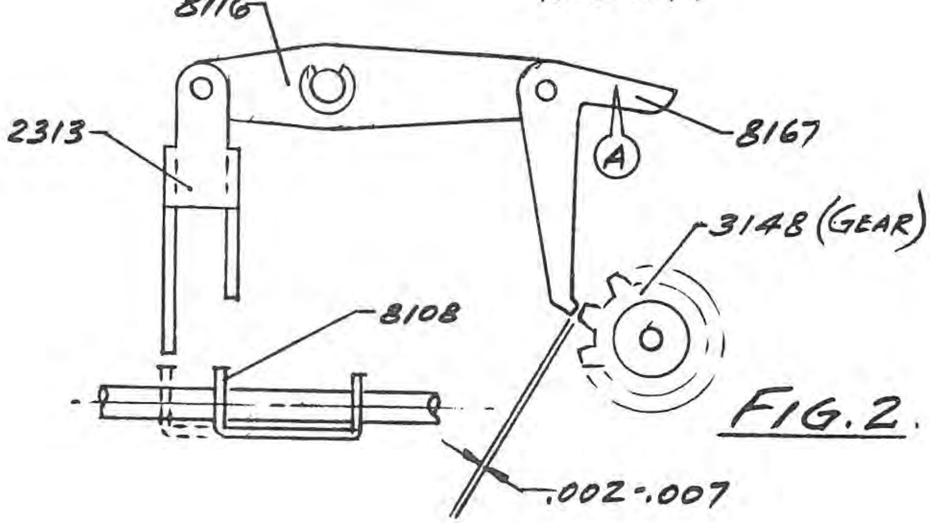


FIG. 2.

11. LIST UNIT GEAR ALIGNMENT

a) Check the List Unit Gears (3008) to see that they align with the Racks. Try with the List Unit at full capacity for the best average alignment, considering the end play in the gears. To adjust, remove Screw (23260) and Eccentric Washer (2253). Remove the Screw (23328) on the left and loosen the Screw (23328) on the right. Slide the Divisor Locator Plate (2180) to the right to permit access to the threaded Sleeve (3740). To shift the List Unit to the left, back off on the threaded sleeve and to shift the List Unit to the right turn the threaded sleeve in. Slide the Plate (2180) back into position, replace the (2) Screws (23328), setting the one on the left snug and tightening down after tightening the screw on the right. Repeat procedure if necessary. (Ref.Fig.1). This Gear and Rack alignment cannot be made on a fully assembled machine. The Accumulator must be removed.

b) Look through the right side of the machine to see that the Flexible List Unit Gear Lock Plate (2360) is in line with the top of the Rack Teeth within + .000 -.010. Adjust by forming the List Unit Gear Lock Plate Locator (2804) on the Right Side Plate. Check especially the alignment of the fingers on the left end of the Flexible Plate (2360). (Ref.Fig.2).

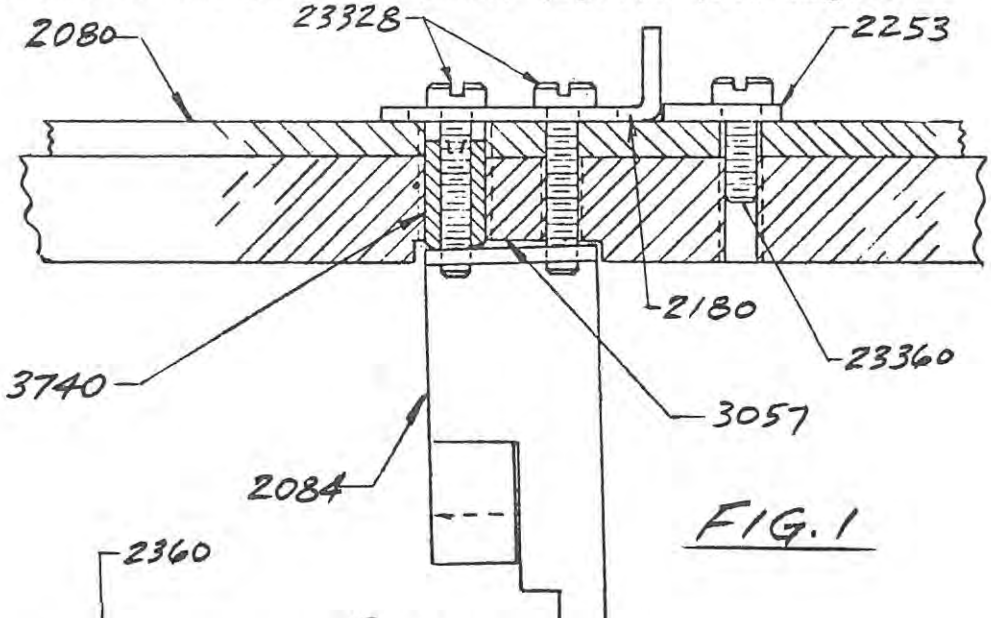


FIG. 1

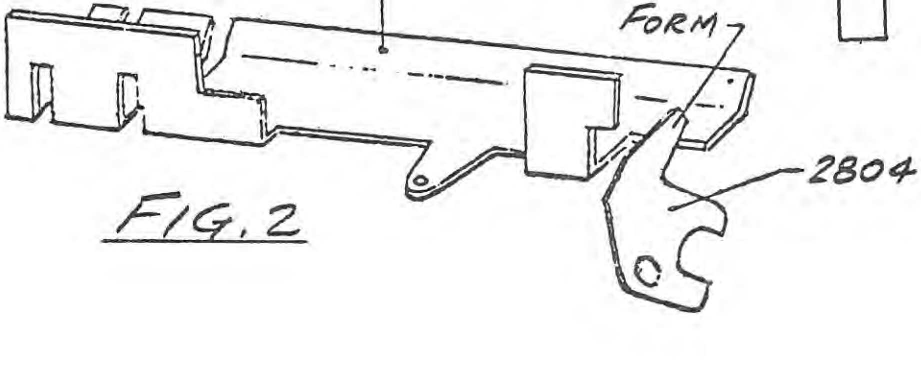
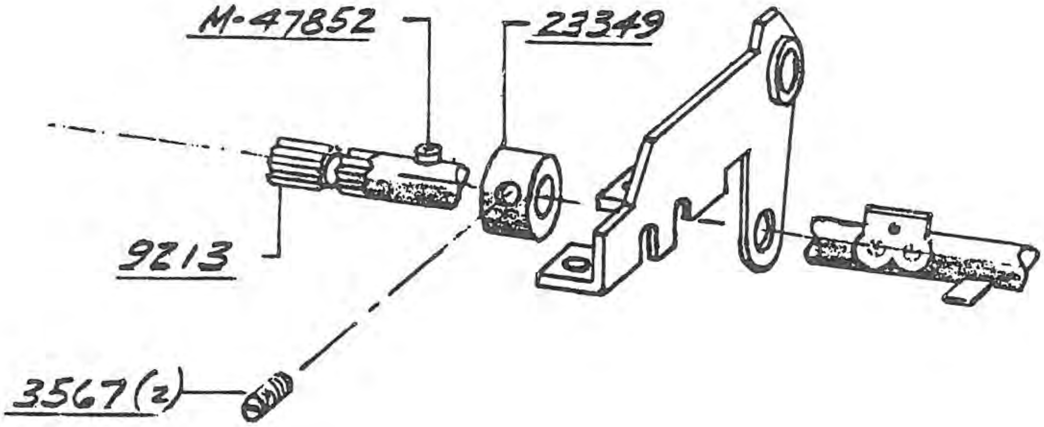


FIG. 2

12. LIST UNIT INPUT SHAFT

Check the List Unit Control (Input) Shaft (9213) for .003 to .007 end play. Adjust the Collar (23349).

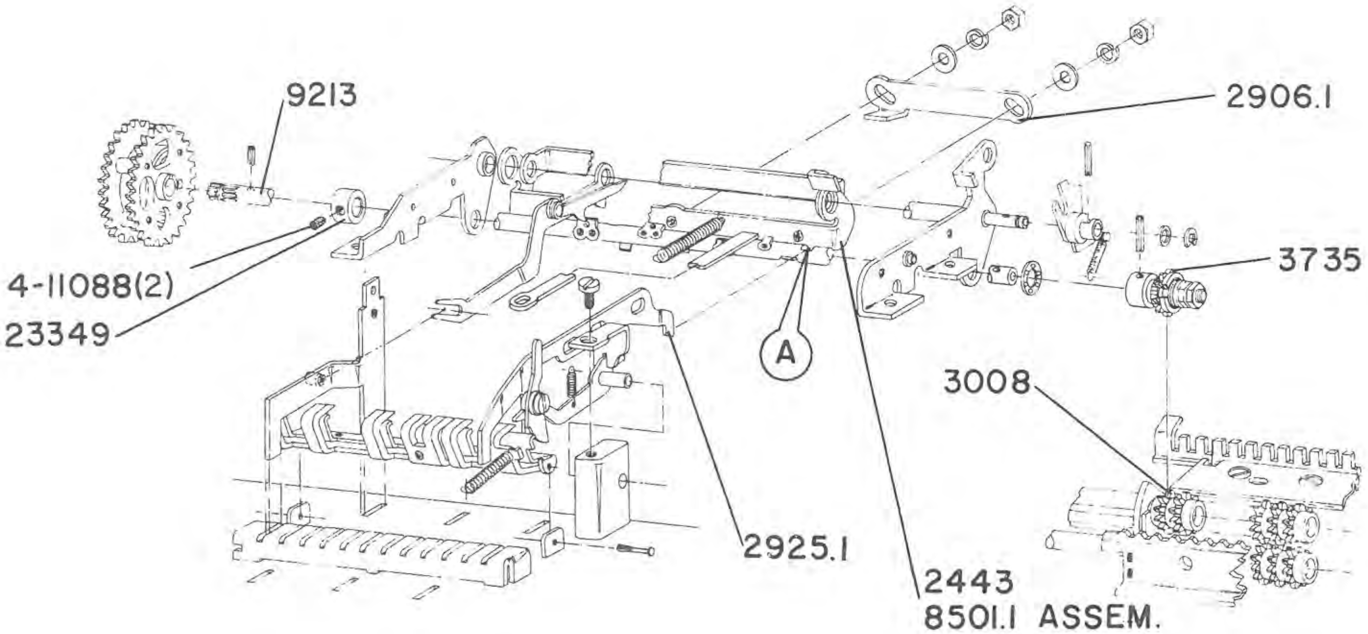


12. LIST UNIT INPUT SHAFT

a) Check the List Unit Control (Input) Shaft (9213) for .003 to .007 end play. Adjust the Collar (23349).

b) The List Unit Control (Input) Shaft (9213) should be positioned so that the cutout (Ref. A) in the shaft allows the Digit Key Lock Bar Control Link (2925.1) to restore fully.
The Shaft (9213) should actuate the Control Link (2925.1) as soon as it starts to rotate and the locating Gear (3735) on the end of the shaft must rotate the upper List Unit Gear (3008) one full tooth space from "0" to "1" positions.

Adjust by shifting the Control Shaft Limit (2906.1) on List Unit Control Shaft Limit Bail (2443) right or left to obtain proper vertical position.



12. LIST UNIT INPUT SHAFT

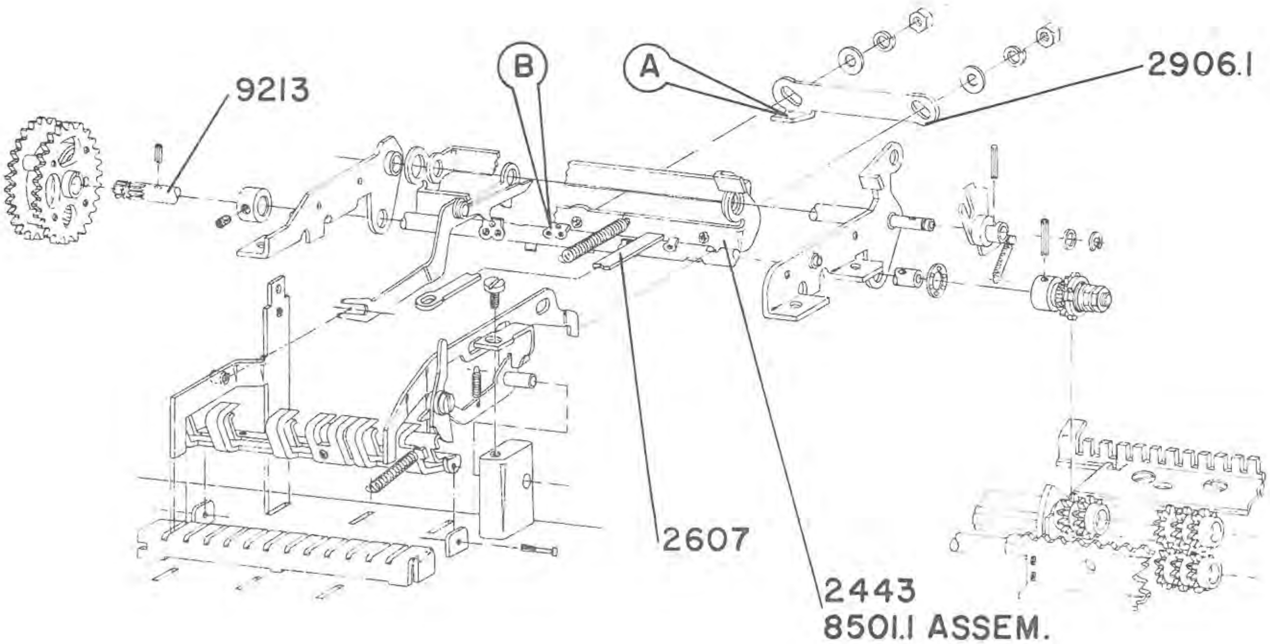
c) The tab (Ref. A) on the Control Shaft Limit (2906.1) must release from the lip (Ref. B) on the List Unit Control Shaft (9213) with .002-.008 clearance when a digit key is fully depressed.

Adjust by means of shim washers (23333) (as required); **between** List Unit Control Shaft Limit Bail (2443) and Control Shaft Limit (2906.1) (washers not shown).

Check all digit keys for release.

d) The tab (Ref. A) on the Control Shaft Limit (2906.1) must clear the List Unit Control Shaft (9213) in home position.

Adjust for not more than .010 clearance by shifting the Limiting Link (2607) on the keyboard to position Assembly (8501.1).



13. LOCATOR WHEEL

a) Position the List Unit in the 15th column. Hold the 16th column List Unit Gear to the left and the Locator Wheel (8554) to the right. There must be 50% engagement between the Locator Wheel and the 15th column List Unit Gear. Position the List Unit in the first column and check to be sure that the List Unit Gear safely clears the flange of the Locator Wheel (8554) (Ref. Fig. 2).

b) The cut in the flange of the Locator Wheel (8554) must align with the List Unit Gears (3008), and the upper side of the cut in the flange must be slightly above the lower edge of the List Unit Upper Lock Plate (2078). (Ref. C. Fig. 1). Adjust by repositioning the Locator Wheel (8554).

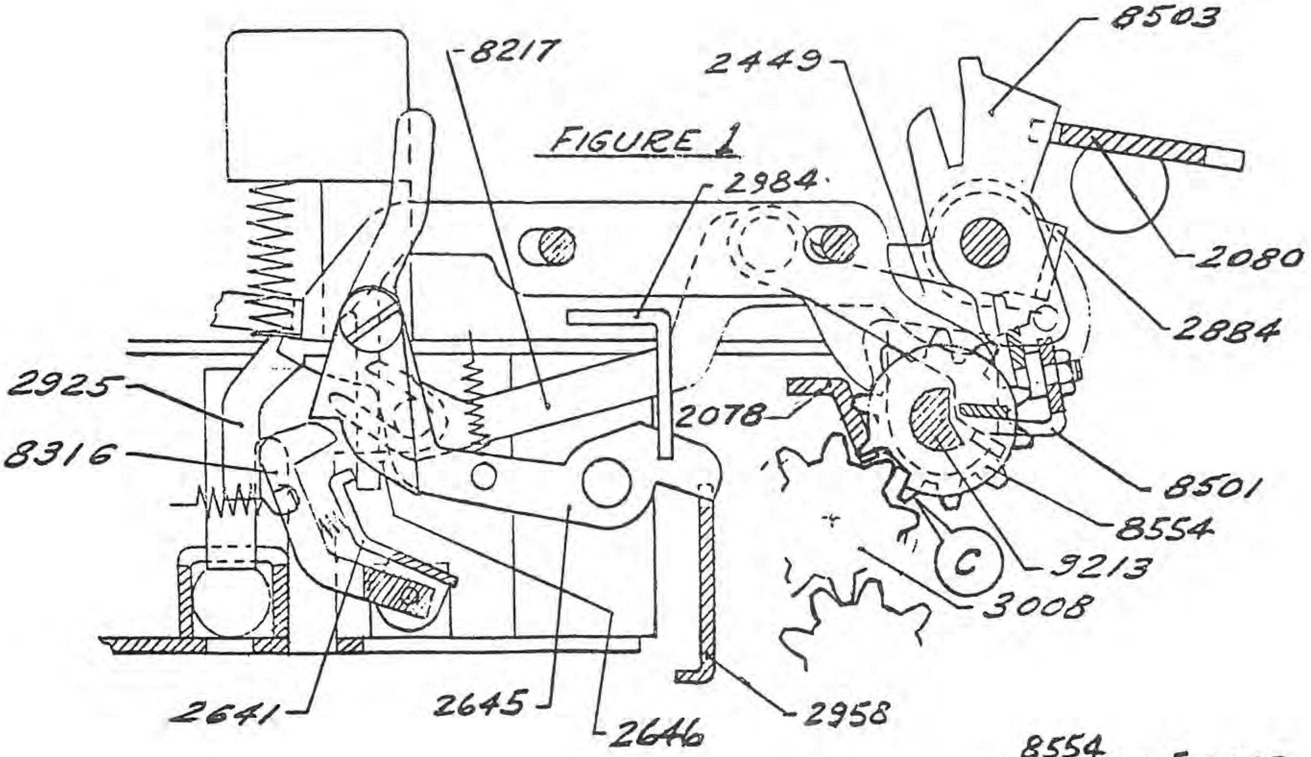


FIGURE 1

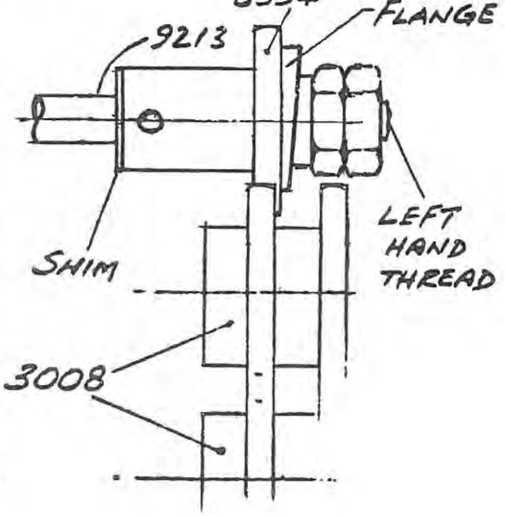


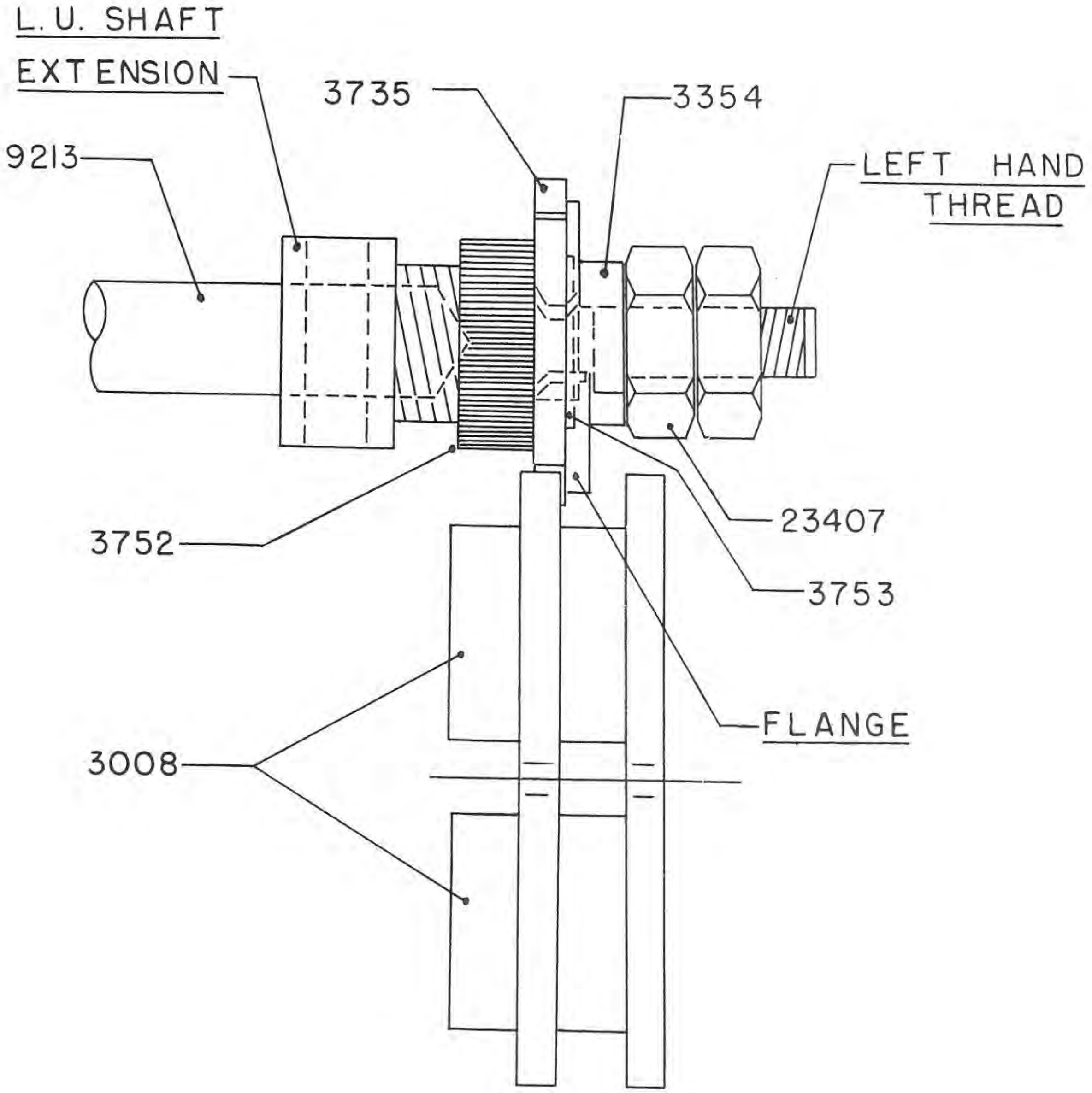
FIG. 2.

13. LOCATOR WHEEL

A) POSITION THE LIST UNIT IN THE 15TH COLUMN. HOLD THE 16TH COLUMN LIST GEAR (3008) TO THE LEFT AND THE LOCATOR WHEEL (3735) TO THE RIGHT. THERE MUST BE 50% ENGAGEMENT BETWEEN THE LOCATOR WHEEL AND THE 15TH COLUMN LIST UNIT GEAR. POSITION THE LIST UNIT IN THE FIRST COLUMN AND CHECK TO BE SURE THAT THE LIST UNIT GEAR SAFELY CLEARS THE FLANGE OF THE LOCATOR WHEEL (3735).

ADJUST BY TURNING THE KNURLED SLEEVE (3752) IN OR OUT.

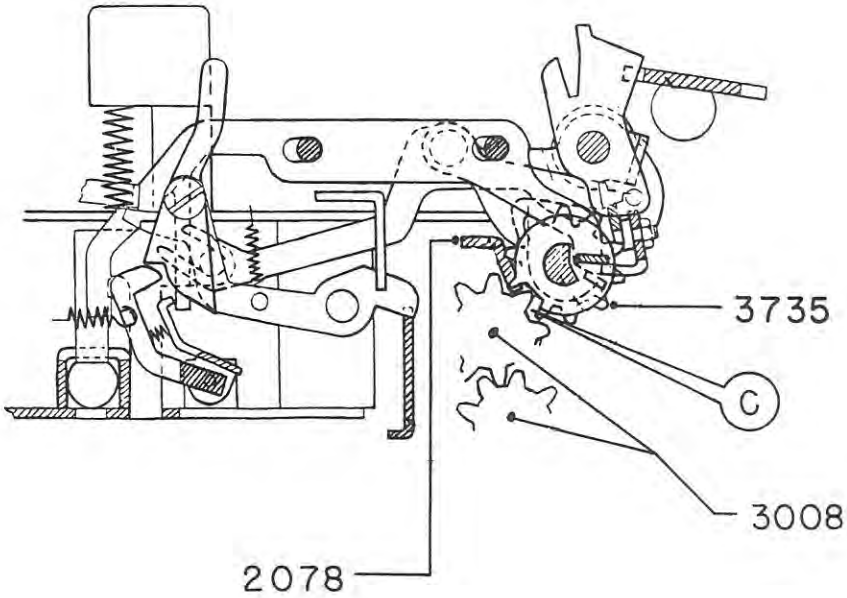
NOTE: AS THE KNURLED SLEEVE IS SCREWED IN OR OUT ON THE LIST UNIT SHAFT EXTENSION, THE INNER LOCK-NUT (23407) SHOULD BE TURNED ACCORDINGLY TO KEEP THE LOCATOR WHEEL AGAINST THE KNURLED SLEEVE. (THE INNER LOCK NUT IS TURNED IN OR OUT DURING THIS PHASE OF THE ADJUSTMENT TO KEEP THE FRICTION WASHER (3753) UNDER TENSION.)



13. LOCATOR WHEEL

B) THE CUT IN THE FLANGE OF THE LOCATOR WHEEL (3735) MUST ALIGN WITH THE LIST UNIT GEARS (3008) , AND THE UPPER SIDE OF THE CUT IN THE FLANGE MUST BE SLIGHTLY ABOVE THE LOWER EDGE OF THE LIST UNIT UPPER LOCK PLATE (2078) .

ADJUST BY ROTATING THE LOCATOR WHEEL (3735) .



14. MULTIPLY COUNTER

a) Check to see that the Zero Drop in Finger (5016) fully aligns with the flange on the Multiply Gear (3007) and that the Multiply Counter Fingers (2325) in Assembly (8146) clear the flange laterally. (Ref. Fig. 2). (Check the first and last column and one column in the center). Adjust by shifting the Multiply Counter Connector Rack (2798) in the List Unit. (Ref. Fig. 3)

b) With machine normal, adjust the eccentric screw holding the Multiply Counter Hook (2323) so that the Hook can be lifted and lowered without catching on the Connector (Ref. Fig. 1).(.004 Max.) (Ref. A).

c) With the List Unit escaped to the left, check for the Connector (8126) to enter the slots in the Multiply Counter Connector Rack (2798) without binding on the side of the slots. There may be a very slight interference but no appreciable roughness should be evident. The Connector (8126) must be held by the Hook (2323) until it enters the Rack (2798).

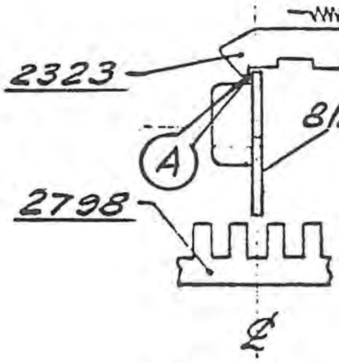


FIG. 1

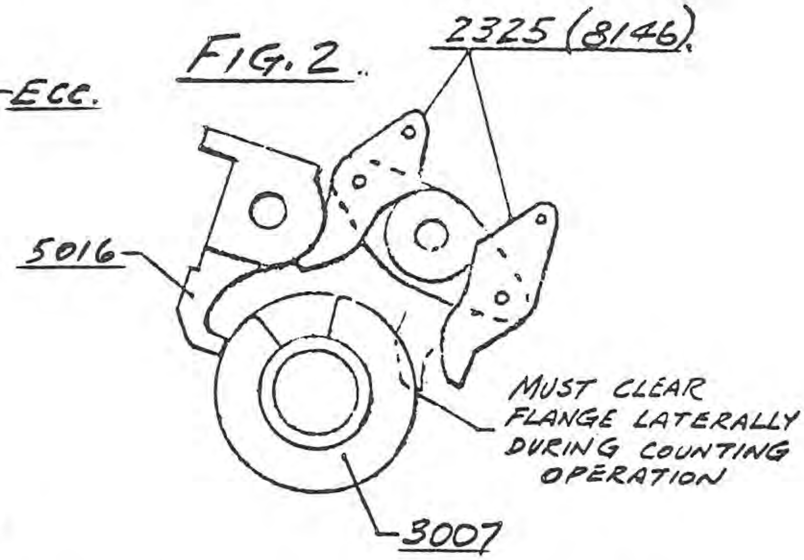


FIG. 2

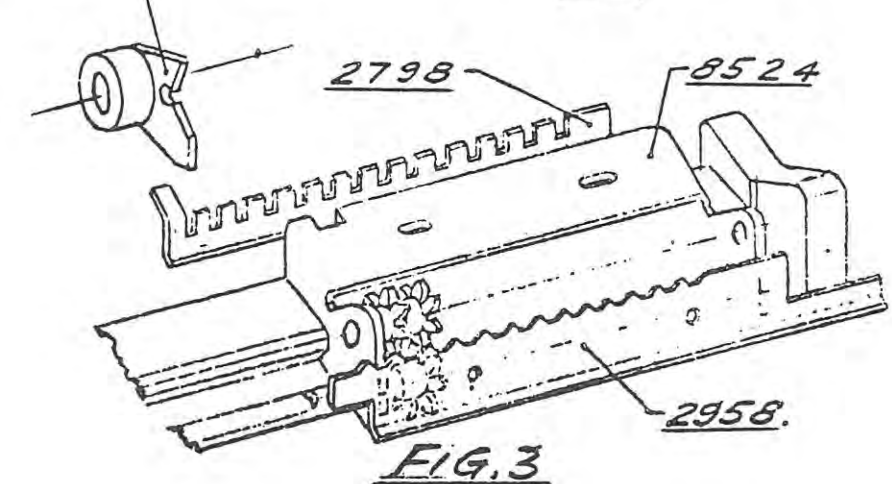
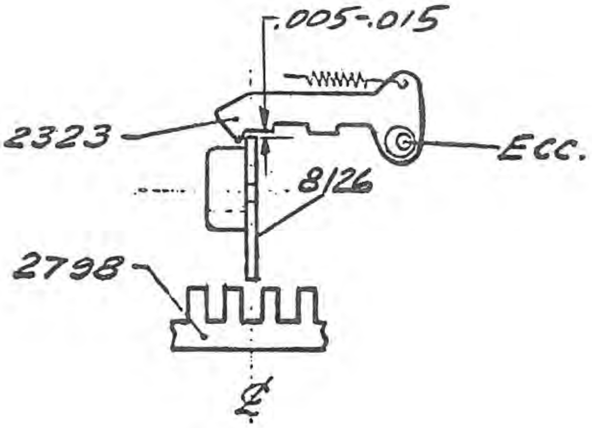


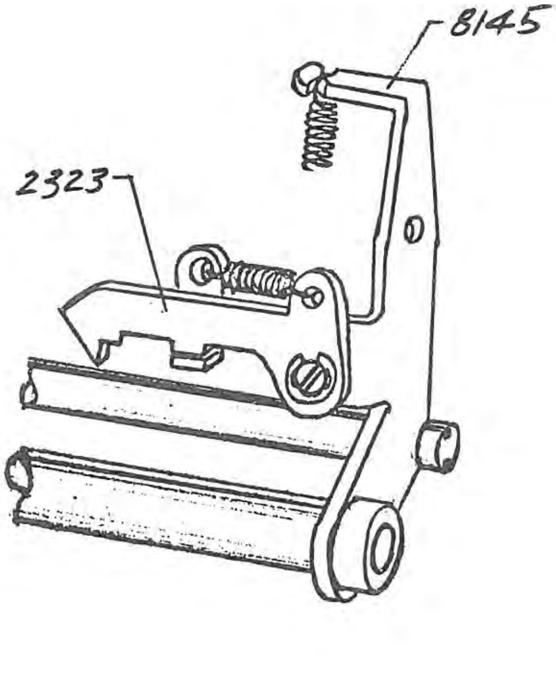
FIG. 3

14. MULTIPLY COUNTER

d) With machine normal, the Mult. Counter Hook (2323) must stop on the formed ear on the Bracket (8145) and latch on the Connector (8126) with .005-.015 clearance between the top of the Connector (8126) and the step on the Hook (2323). Adjust by forming the Bracket (8145).

e) The Connector (8126) and the Hook (2323) must clear each other when the List Unit is operated to the left after second depression of the Multiply or Division Keys or by Decimal Key depression after first depression of Multiply and Division Keys.



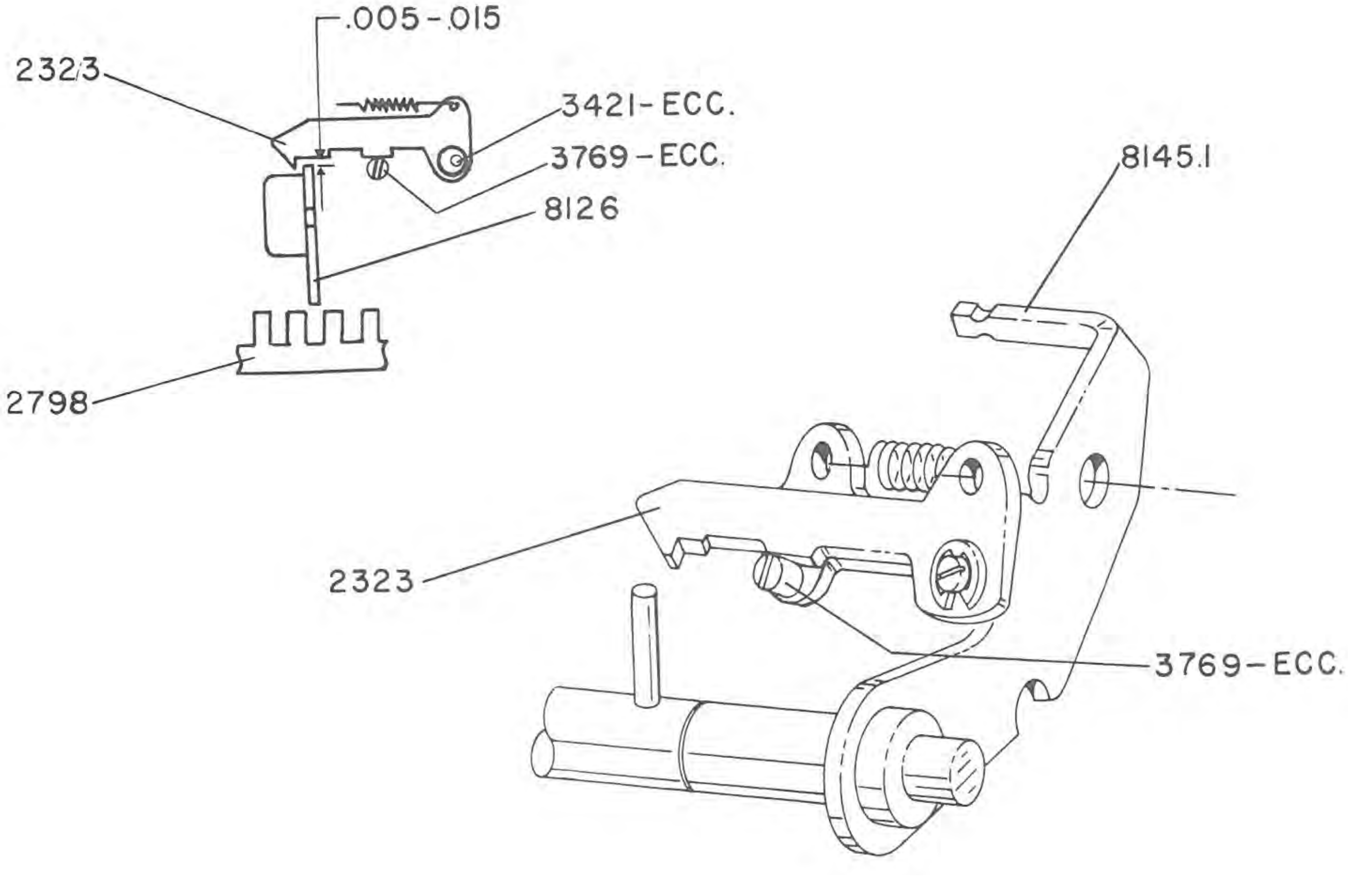


14. MULTIPLY COUNTER

d) With machine normal, the Mult Counter Hook (2323) must stop on the Eccentric (3769) on the Bracket (8145.1) and latch on the Connector (8126) with .005-.015 clearance between the top of the Connector (8126) and the step on the Hook (2323).

Adjust by means of the Eccentric (3769) or by remaking Adjustment (14b). It may be possible to radially position (up or down) the Eccentric (3421) to meet the requirements for this Adjustment (14d) and previous Adjustment (14b).

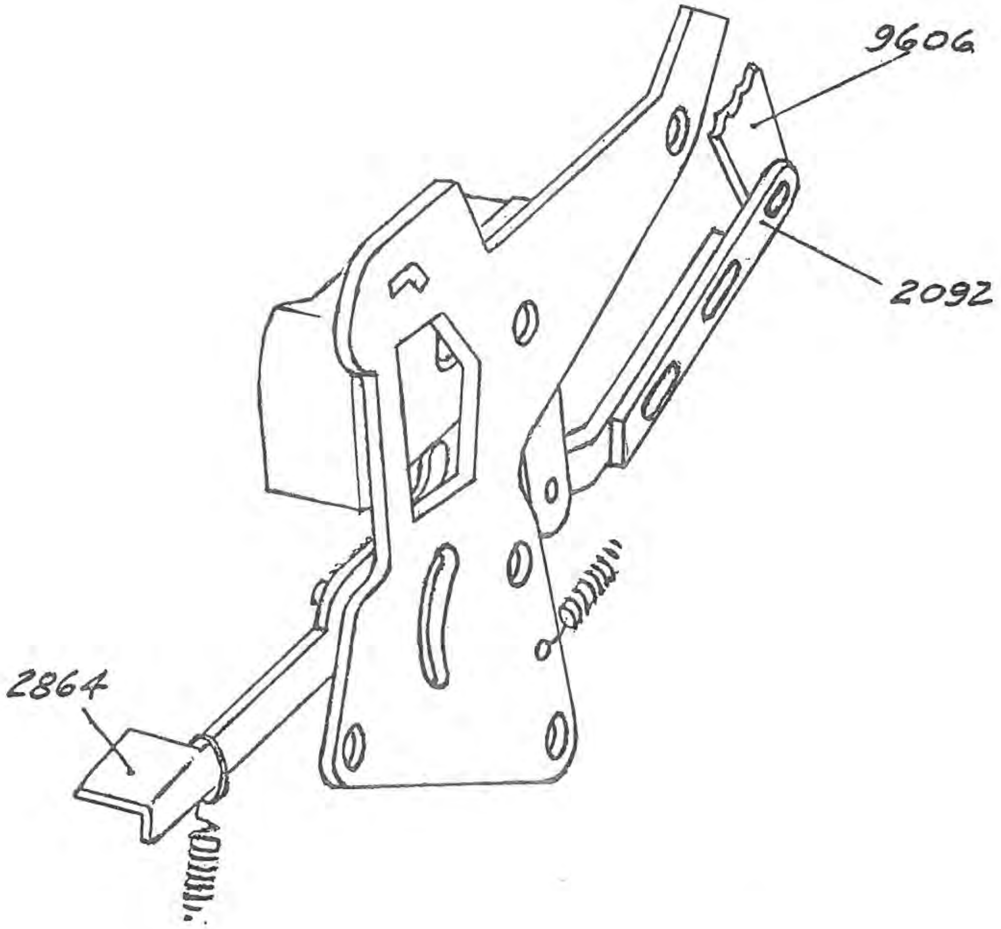
e) The Connector (8126) and the Hook (2323) must clear each other when the List Unit is operated to the left after second depression of the Multiply or Division Keys or by Decimal Key depression after first depression of Multiply and Division Keys.



15. LIST UNIT MESH

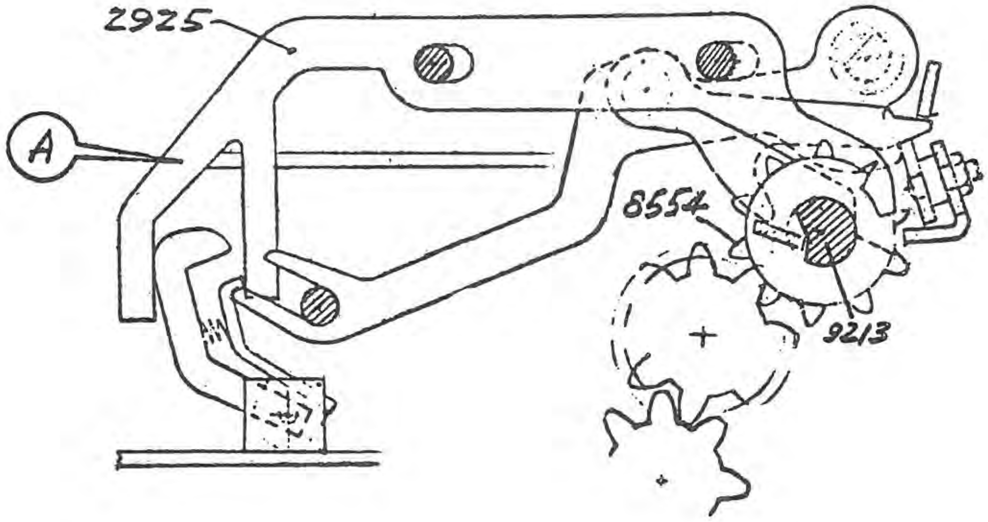
a) Index 16 zeros in the keyboard, depress the Add Bar, rotate the Main Shaft until the Forward Stroke Bar is fully down and adjust the List Unit Actuating Link (2092) to hold the List Unit in snug mesh with the Transfer Racks without straining the Racks.

b) As the cycle is continued, manually actuate and hold the Non Print Bellcrank (2581) on the Top Plate (see Fig. 1 Adj. 37) to prevent restoring of List Unit and hold the Return Stroke Bar Hook in until the Return Stroke Bar is fully down. The List Unit should be in mesh without straining the Racks.



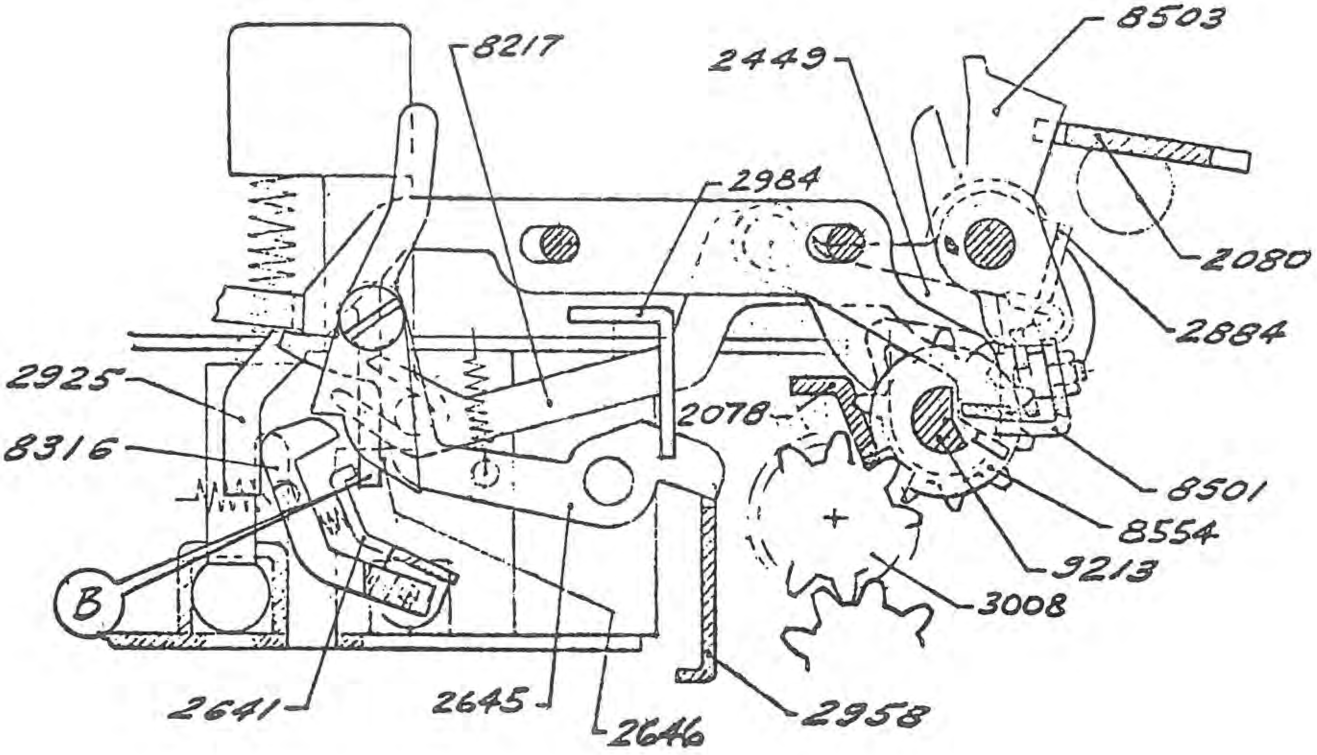
16. DIGIT KEY LOCK BAR CONTROL

a) Hold the List Unit Control (Input) Shaft (9213) and depress #8 Digit Key. Revolve the shaft slowly until the half step escapement takes place. After the key releases from the Inner Latch (2641), the Outer Latch (8316) should release the key between position 8 and 8 1/2 of the Locator Wheel (8554). To adjust form the finger (Ref. A) on the Digit Key Lock Bar Control Link (2925).



16. DIGIT KEY LOCK BAR CONTROL

b) When the Digit Key is restored, the finger (Ref. B) on the Digit Key Lock Bar Control Link (2925) should hold the Inner Digit Key Latch Bar (2641) so that on the next Digit Key depression there is no interference with the Inner Latch Bar (2641). To check this, hold the List Unit Control Shaft (9213) so as not to turn and depress the Digit Keys to check for interference. To adjust, form the finger (Ref. B) on the Link (2925).

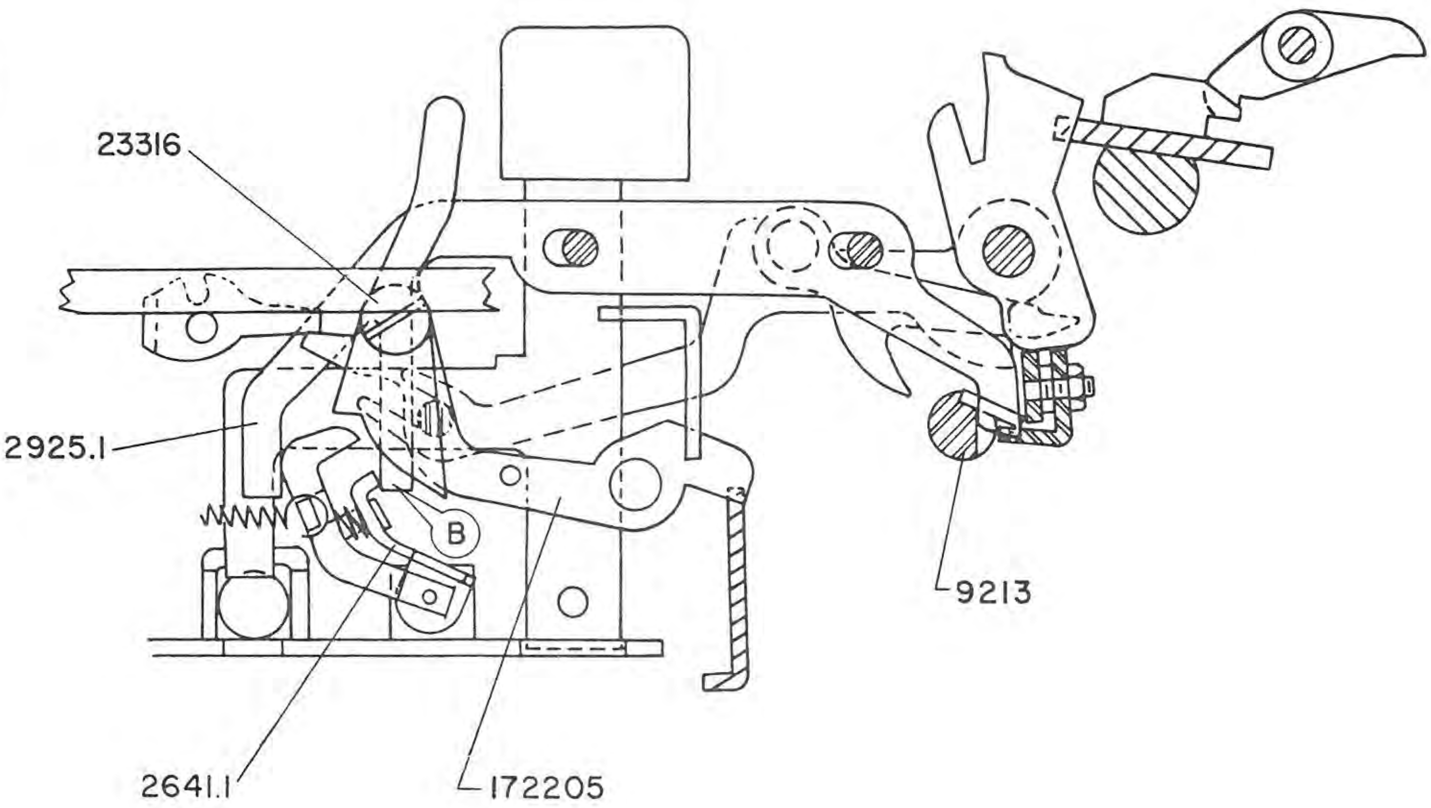


16. DIGIT KEY LOCK BAR CONTROL

b) When the Digit Key is restored, the Finger (Ref. B) on the Digit Key Lock Bar Control Link (2925.1) should hold the Inner Digit Key Latch Bar (2641.1) so that on the next Digit Key depression there is no interference with the Inner Digit Key Latch Bar (2641.1).

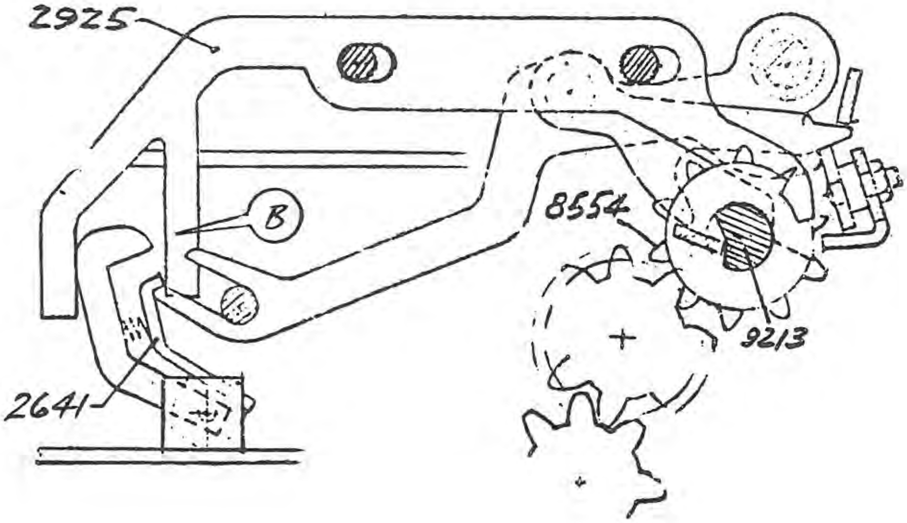
To check this, hold the List Unit Control Shaft (9213) so as not to turn and depress the Digit Keys to check for interference.

To adjust, form the Finger (Ref. B) on the Link (2925.1).



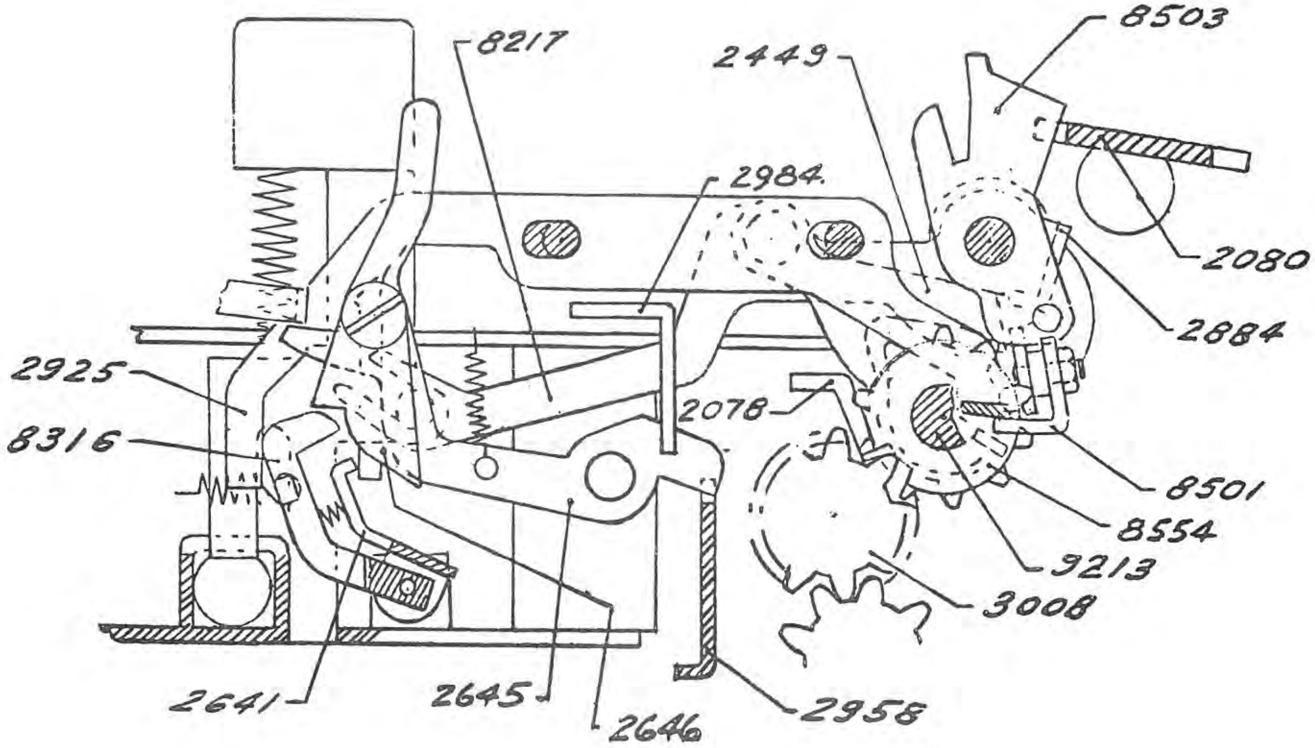
16. DIGIT KEY LOCK BAR CONTROL

c) Hold the List Unit Control (Input) Shaft (9213) and depress a digit key. Allow the Shaft (9213) to rotate slowly until the Digit Key Lock Bar Control Link (2925) has moved .010 - .020 (visual check). At this point the Digit Key should latch on the Inner Digit Key Latch Bar (2641). To adjust, form the finger (Ref. B) on the Link (2925). Check several keys. If adjustment is made, recheck Adj. 16B.



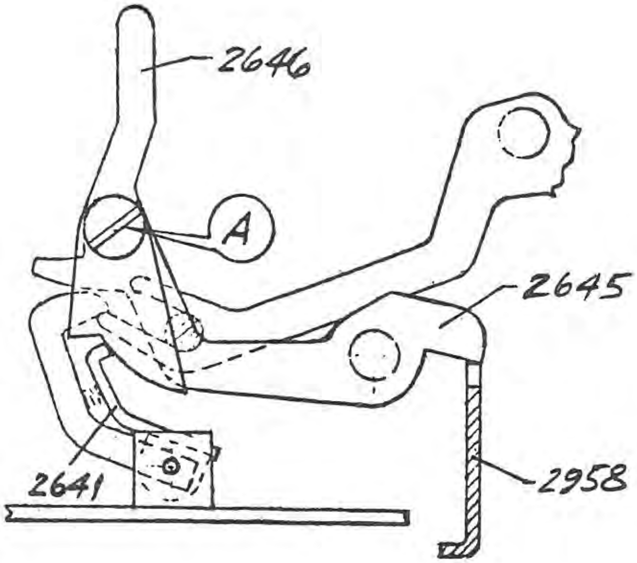
17. DIGIT KEY RELEASE

a) The rear point of the Digit Key Release Trip Arm (2645) should be between the teeth of the Digit Key Release Rack (2958) on the List Unit. To check, hold the Divisor Locator Arm (3367) and disengage the Escapement Finger (8503) manually and see that the List Unit moves to the right or left of the Escapement Finger (8503) before starting to actuate the Digit Key Release Trip Arm (2645). Adjust by shifting the Digit Key Release Lever Guide (2984) on top of the keyboard.



17. DIGIT KEY RELEASE

b) Hold the Divisor Locator Arm (3367) and disengage the Escapement Finger (8503) to allow the List Unit to move through the half step position. As it comes to half step position and the Digit Key Release Trip Arm (2645) rests on top of the Digit Key Release Rack (2958), the Digit Key Release Contact Arm (2646) should move the Inner Digit Key Latch Bar (2641) slightly (up to .020 visual). Adjust by repositioning the Contact Arm (2646) through the screw (Ref. A). Check across the machine.



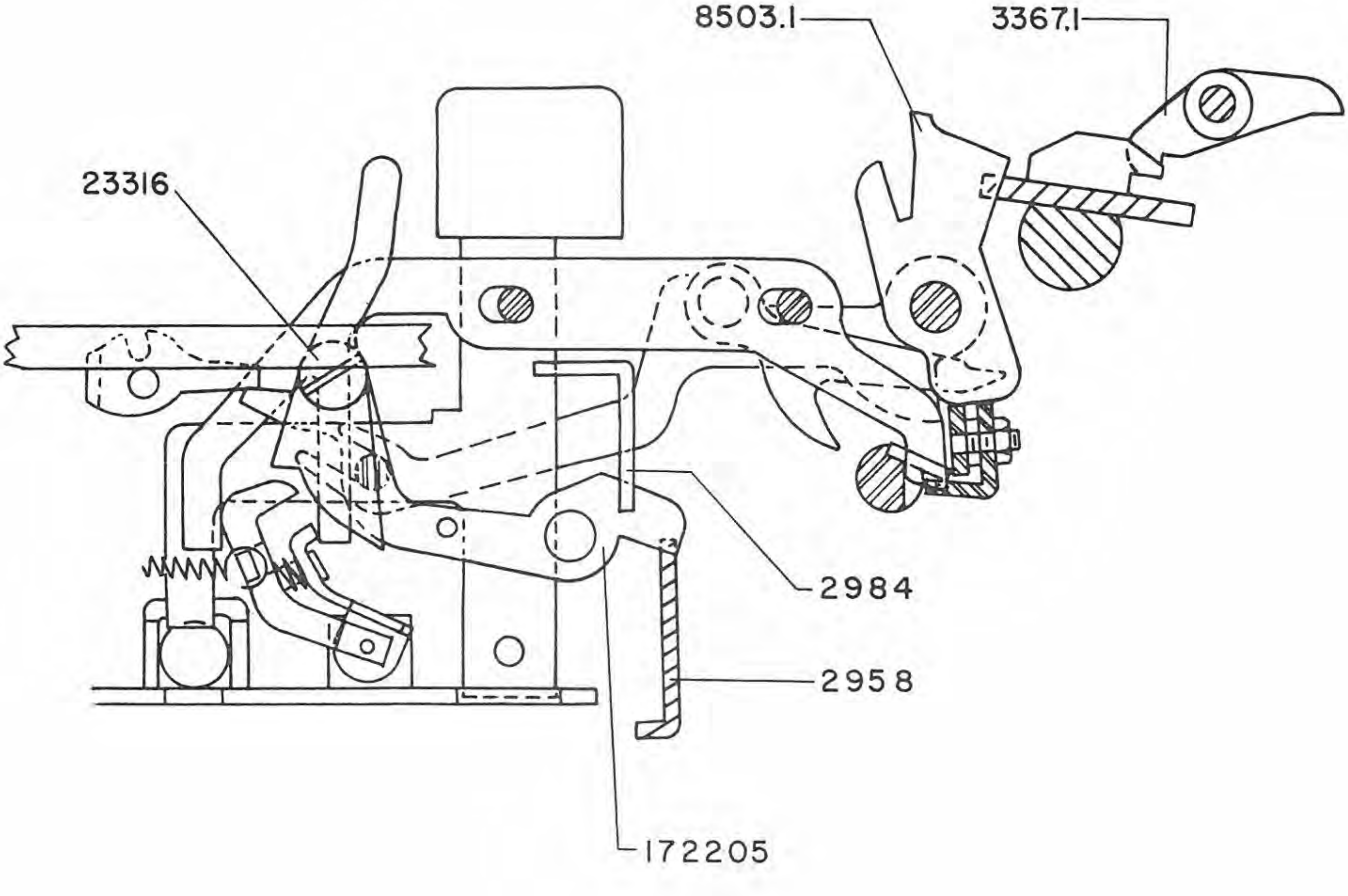
17. DIGIT KEY RELEASE

a) The rear point of the Digit Key Release Trip Arm (172205) should be between the teeth of the Digit Key Release Rack (2958) on the List Unit.

To check, hold the Divisor Locator Arm (3367.1) and disengage the Escapement Finger (8503.1) manually.

The List Unit must move to the right or left of the Escapement Finger (8503.1) before starting to actuate the Digit Key Release Trip Arm (172205).

Adjust by shifting the Digit Key Release Lever Guide (2984) on top of the keyboard.

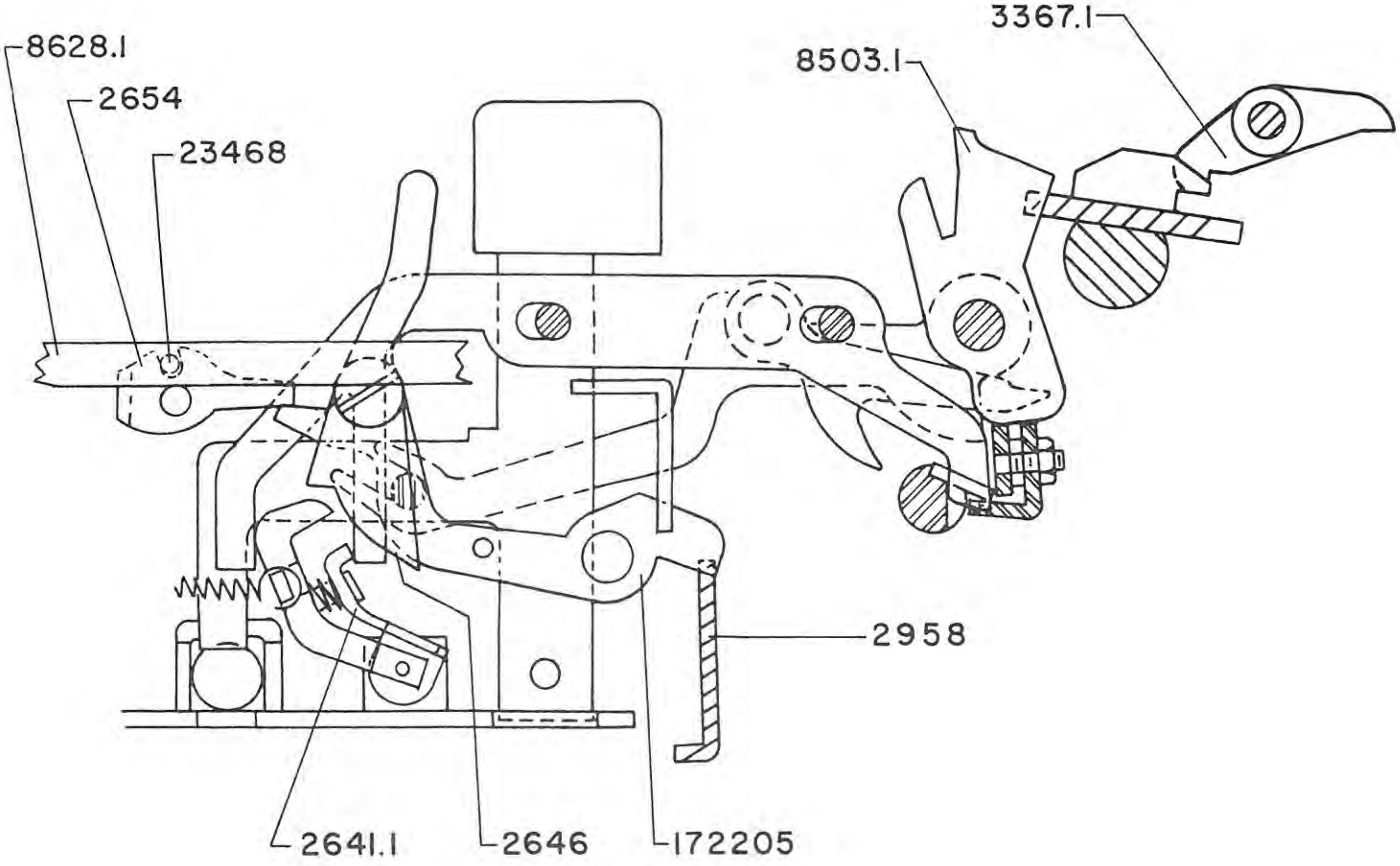


17. DIGIT KEY RELEASE

b) Hold the Divisor Locator Arm (3367.1). Disengage the Escapement Finger (8503.1) and allow the List Unit to move to the left.

If the List Unit is sluggish or binding on the Trip Arm (172205), adjust the Eccentric (23468) on the Zero Escapement Actuator Link Assembly (8628.1) to raise the rear portion of the Trip Arm (172205) enough to relieve this condition, however, Trip Arm (172205) must be meshed as deep as possible with Release Rack (2958) without binding the List Unit.

NOTE: When making this Adjustment (17b) be sure that the Contact Arm (2646) does not restrict or interfere with the action of the Inner Digit Key Latch Bar (2641.1).

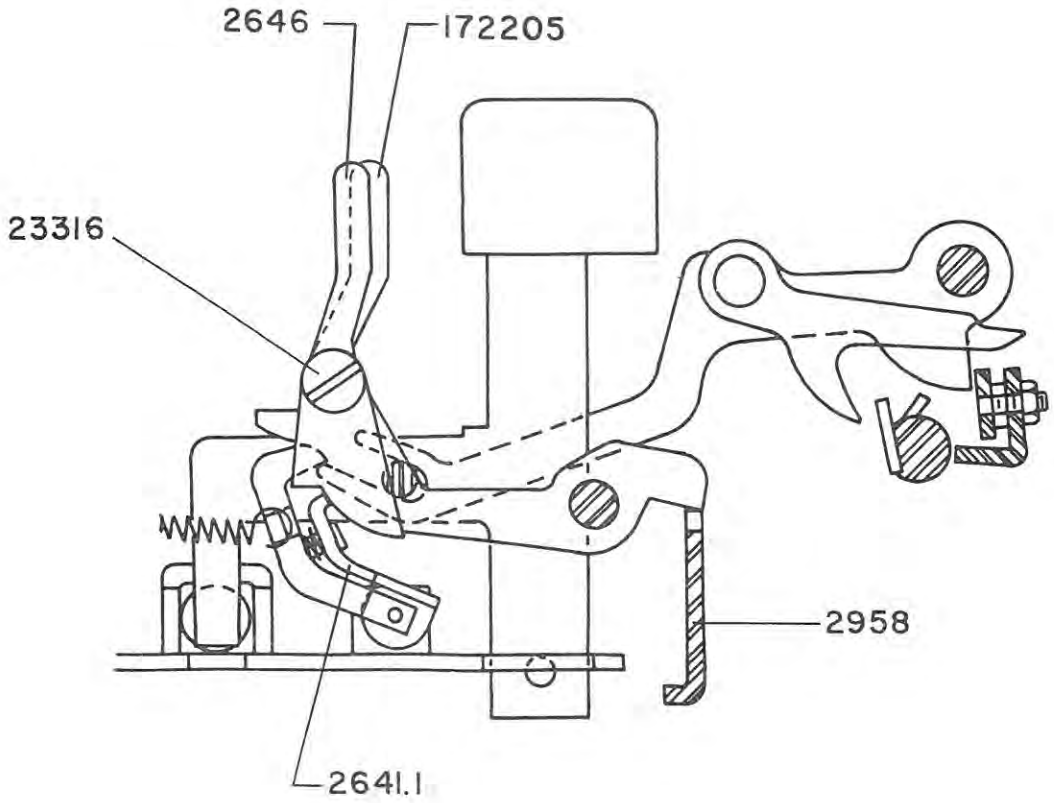


17. DIGIT KEY RELEASE

c) Hold the Divisor Locator Arm (3367.1), disengage the Escapement Finger (8503.1) and allow the List Unit to move through the half step position.

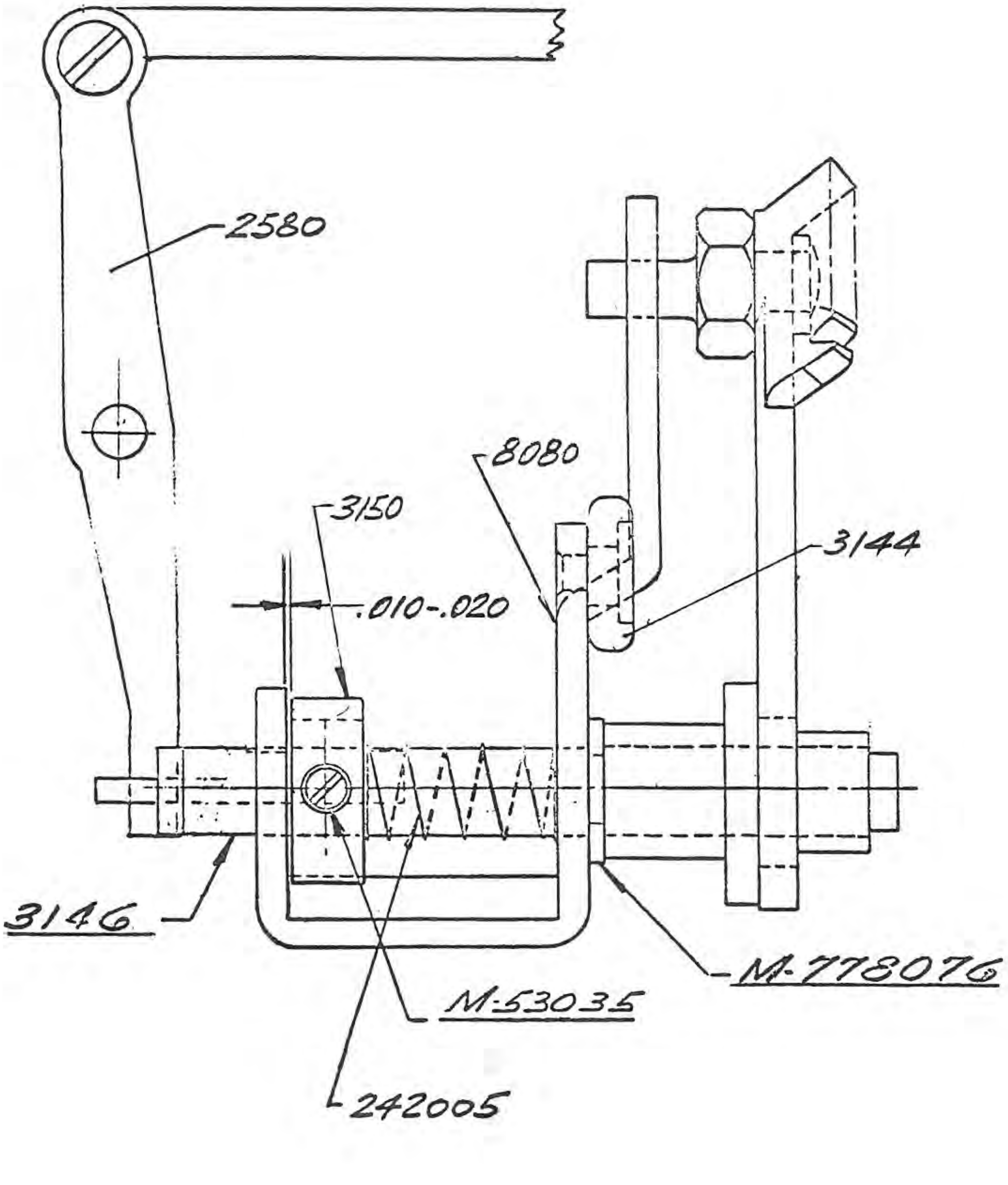
As it comes to half step position and the Digit Key Release Trip Arm (172205) rests on top of the Digit Key Release Rack (2958), the Digit Key Release Contact Arm (2646) should move the Inner Digit Key Latch Bar (2641.1) slightly (up to .020 visual).

Adjust by repositioning the Contact Arm (2646) by means of screw (23316). (When adjustment is satisfactory, clamp the extensions of Trip Arm (172205) and Contact Arm (2646) with pliers and lock screw securely.)



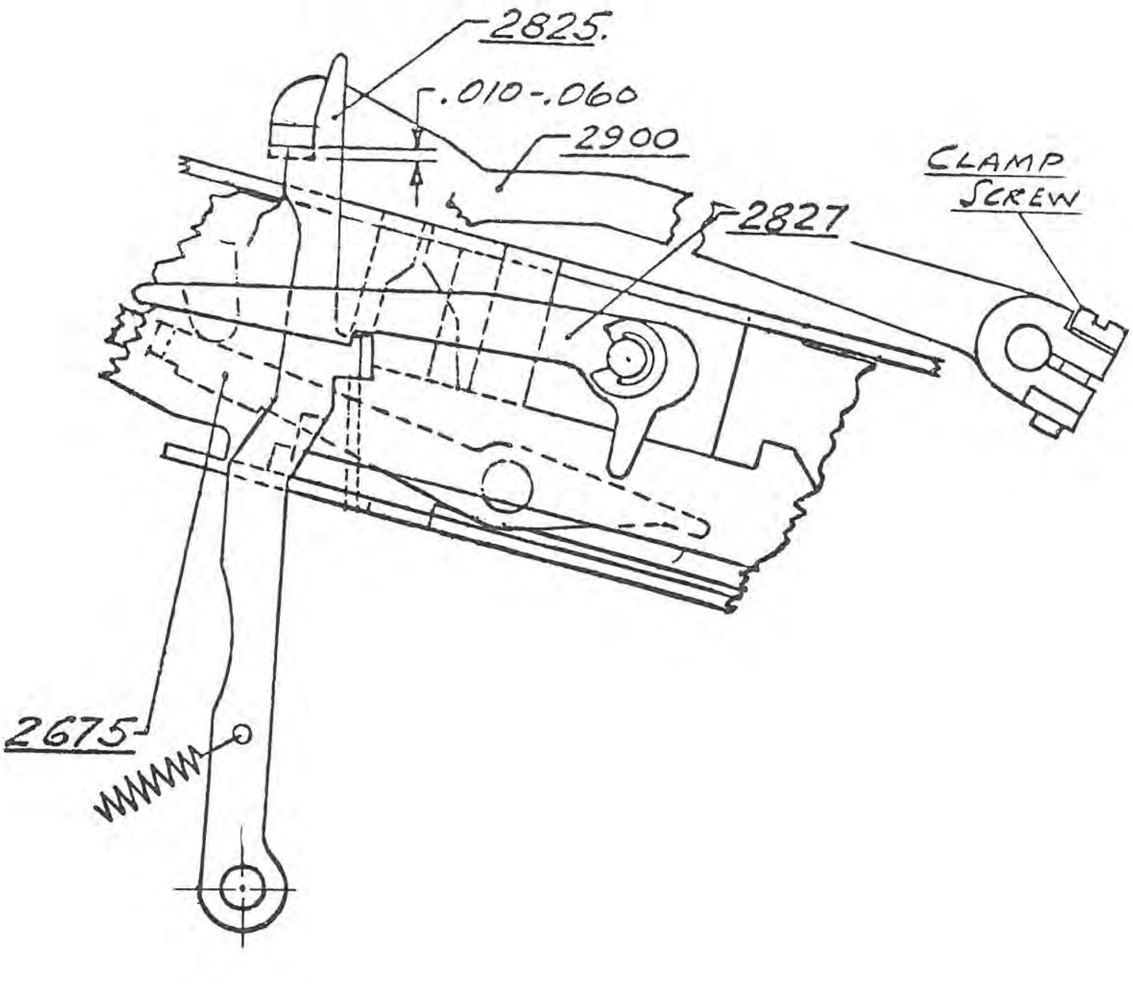
18. LIST UNIT RESET SEGMENT

With the Non Print Link Actuating Finger (2580) disconnected, locate the List Unit Reset Shaft Set Collar (3150), with the Coil Spring (242005) inside the List Unit Reset Segment (9699).010 - .020 from the List Unit Reset Bellcrank (8080). With Finger (2580) assembled, check to see that the Roller (3144) on Bellcrank (8080) fully aligns with the cam.



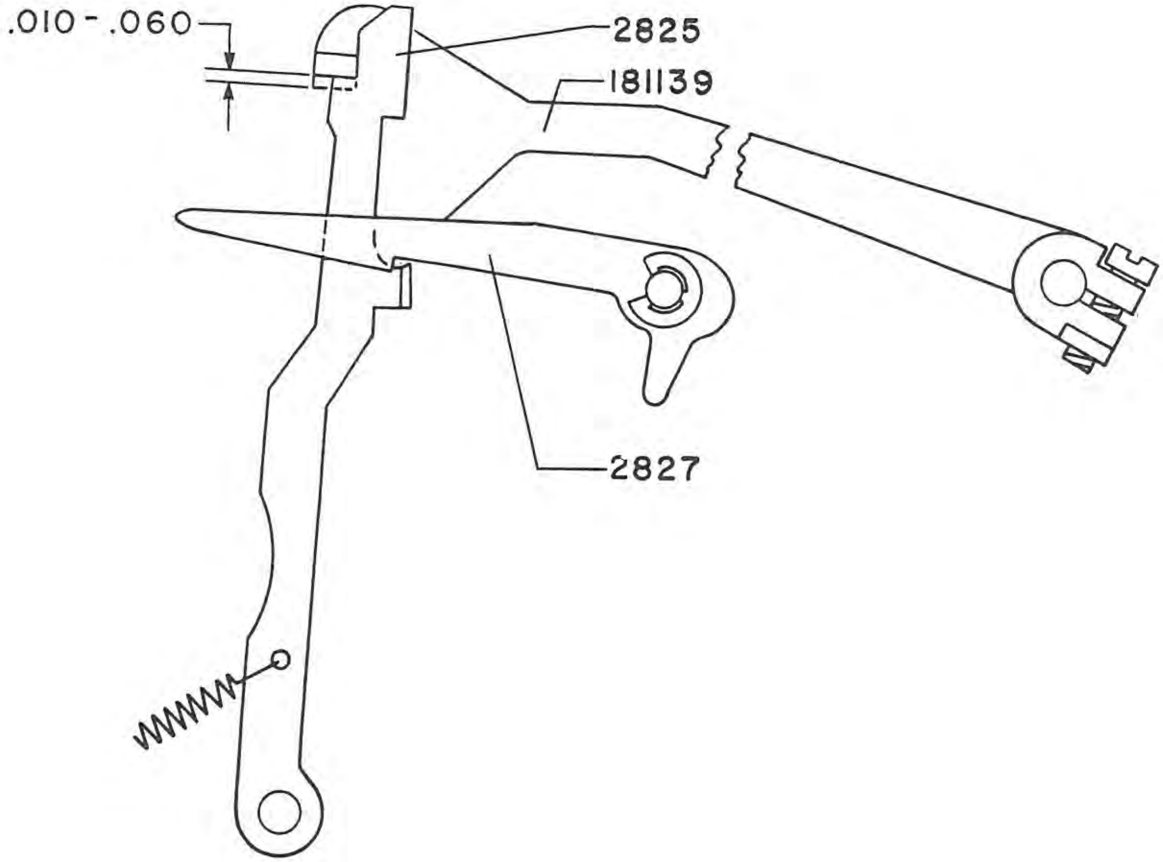
19. FULL STROKE ARM

Adjust the Full Stroke Arm (2900) to release the Feature Keys and to have .010 to .060 further movement after releasing each Feature Key. Adjust by the Clamp Screw on the Full Stroke Arm (2900). (Be sure that as each Feature Key is depressed to its first step, the motor is not tripped and adequate clutch hold is obtained (Ref. Adj. 21).



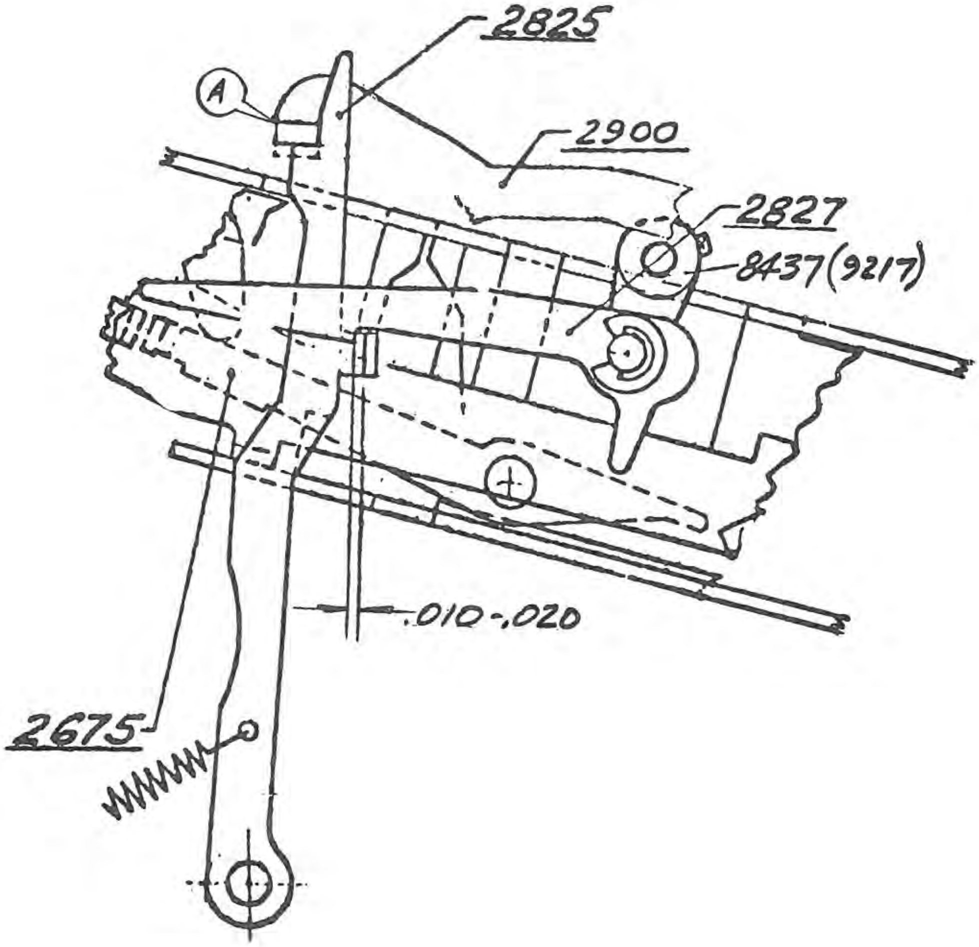
19. FULL STROKE ARM

Adjust the Full Stroke Arm (181139) to release the feature keys and to have .010 to .060 further movement after releasing each feature key. Adjust by the clamp screw on the Full Stroke Arm (181139). (Be sure that as each feature key is depressed to its first step, the motor is not tripped and adequate clutch hold is obtained (Ref. Adj. 21).



20. MOTOR TRIP ARM

Adjust the Motor Trip Arm Assembly (8437) on the Motor Trip Shaft Assembly (9217) to give the Motor Trip Hook (2827) .010 - .020 clearance to the rear of the lip of the Full Stroke Arm Lift Link (2825). Adjust by the set screws on the hub. Check to see that there is no possibility of the Motor Trip Hook (2827) slipping off the end of the lip of the Full Stroke Arm Lift Link (2825) or by passing the Lip (Ref. A) on the Full Stroke Arm (2900). If necessary, form the Motor Trip Hook (2827).



20. MOTOR TRIP ARM

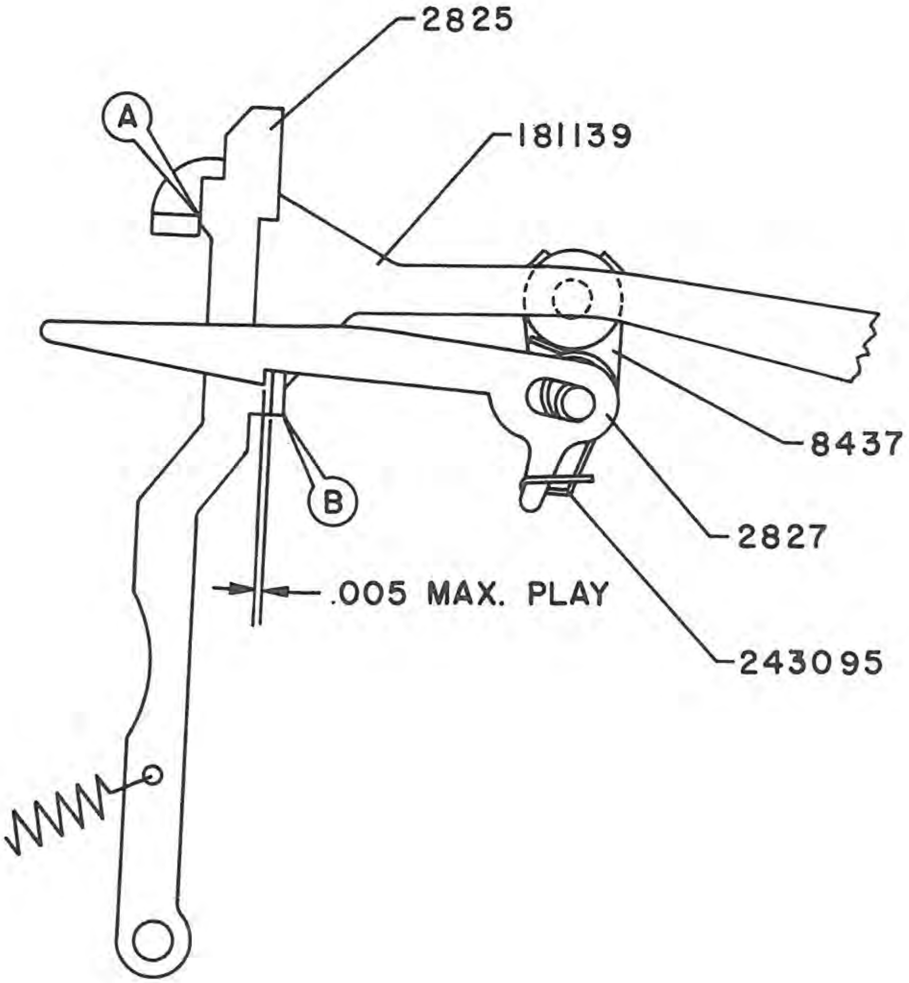
Depress the total key to the first step and hold the Full Stroke Arm Lift Link (2825) against the lip (Ref. A) on the Full Stroke Arm (181139).

There must be slight play (.005 max. recommended) in the Motor Trip Hook (2827).

Adjust by positioning the Motor Trip Arm Assembly (8437) by means of the set screws on the hub.

There must be no possibility of the Motor Trip Hook (2827) by passing the lip (Ref. A) on the Full Stroke Arm (181139) or slipping off the end of the lip (Ref. B) on the Full Stroke Arm Lift Link (2825). If necessary, form the Motor Trip Hook (2827).

The Torsion Spring (243095) for the Motor Trip Hook (2827) should be preloaded two turns when assembled.



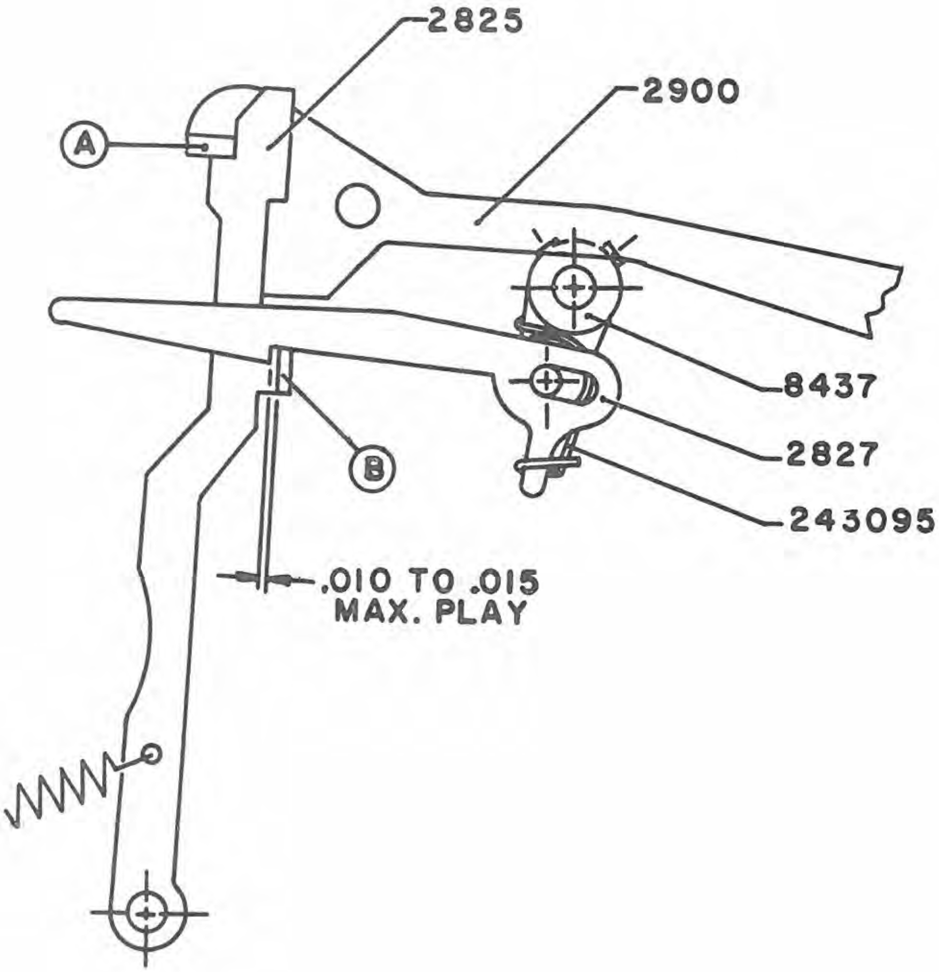
20. MOTOR TRIP ARM

WITH THE MACHINE NORMAL, THERE MUST BE .010 TO .015 BETWEEN THE LATCHING POINT ON MOTOR TRIP HOOK (2827) AND EXTENSION OF FULL STROKE ARM LIFT LINK (2825).

ADJUST BY POSITIONING THE MOTOR TRIP ARM ASSEMBLY (8437) BY MEANS OF THE SET SCREWS ON THE HUB.

THERE MUST BE NO POSSIBILITY OF THE MOTOR TRIP HOOK (2827) BY-PASSING THE LIP (REF. A) ON THE FULL STROKE ARM (2900) OR SLIPPING OFF THE END OF THE LIP (REF. B) ON THE FULL STROKE ARM LIFT LINK (2825). IF NECESSARY, FORM THE MOTOR TRIP HOOK (2827).

THE TORSION SPRING (243095) FOR THE MOTOR TRIP HOOK (2827) SHOULD BE PRELOADED TWO TURNS WHEN ASSEMBLED.



21. FULL STROKE ARM

With feature key fully depressed, the clutch dog clearance shall be at least .010 inch. With feature key latched on first step, check hold on clutch dog. Arm (5627) must rest at break of form on microswitch at first step.

Figure 1 - Depress each feature key to its first step and note that the motor has not been tripped. The Full Stroke Link (8083) must still have a good hold on the Drive Clutch Pawl (2829) (Ref. A). Check each key for same condition. Figure 2 - with the key in the lower latched position, the Full Stroke Link (8083) must clear the Drive Clutch Pawl (2829) by at least .010. Adjust by forming Full Stroke Link (8083) at Point "C" using Tool ST-2000250.

Figure 1 - Be sure that there is no interference (Ref. B) between the Continuous Running Slide (8085) and the Full Stroke Link (8083) when a feature key is latched down and the Slide (8085) is actuated.

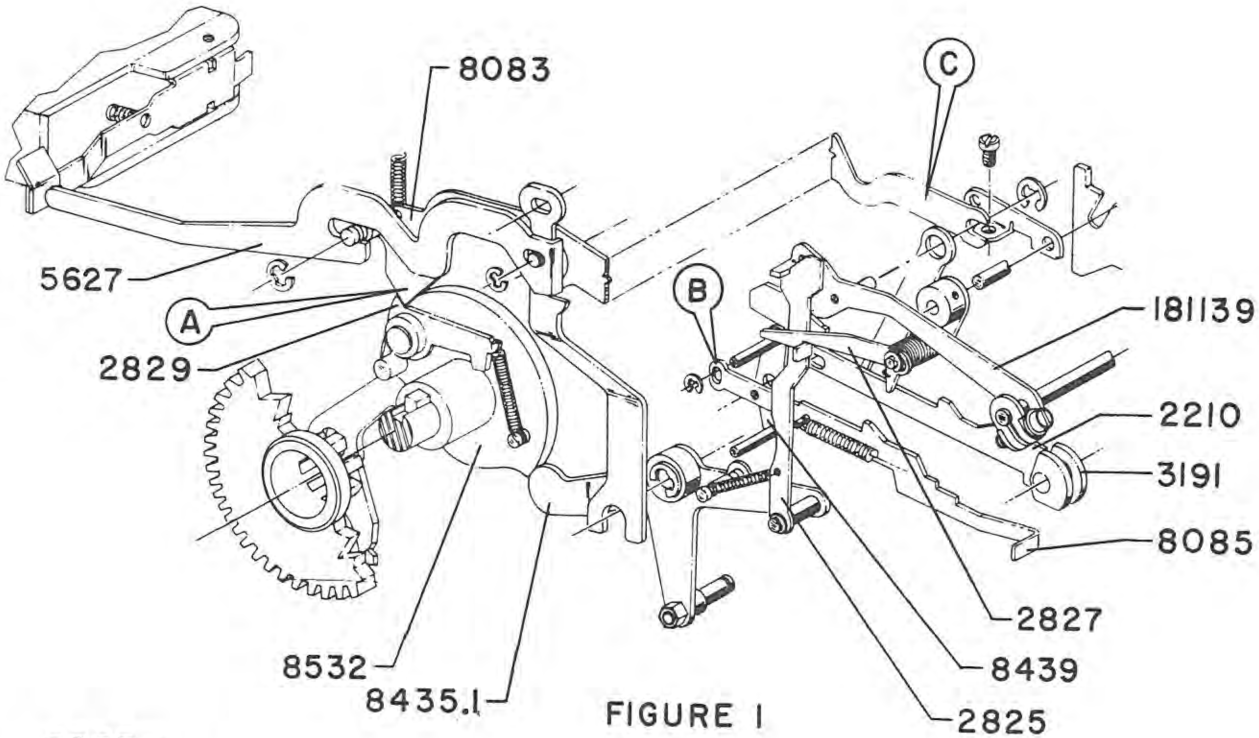


FIGURE 1

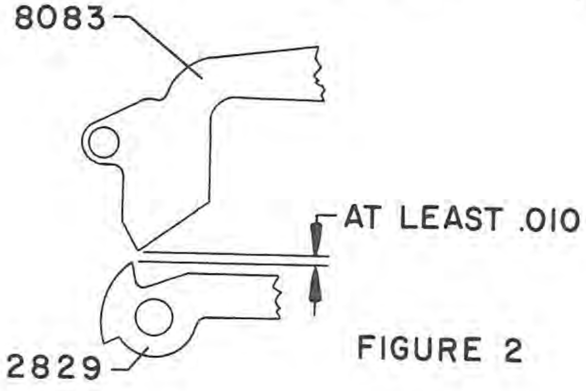
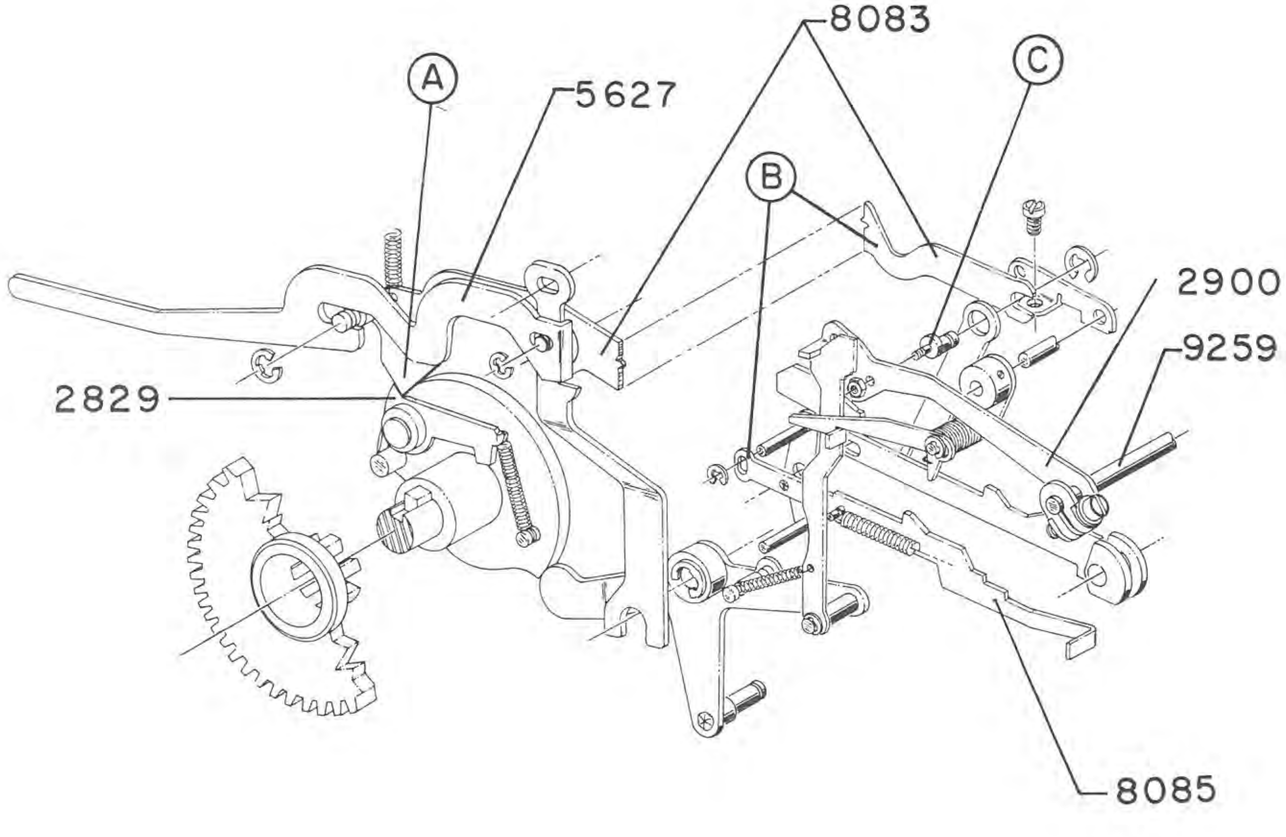


FIGURE 2

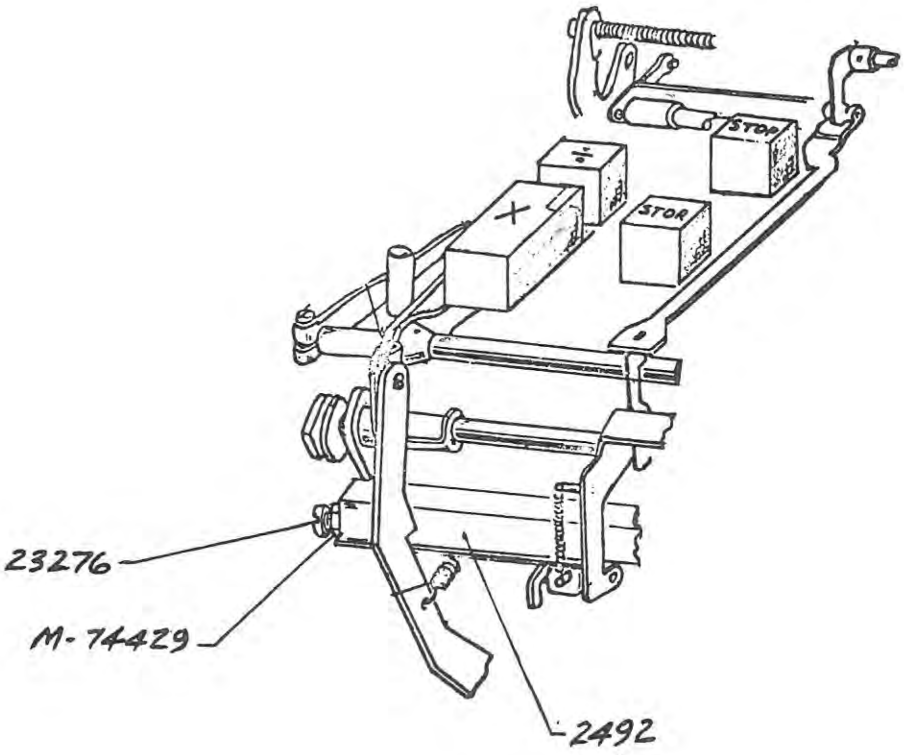
21. FULL STROKE ARM

DEPRESS EACH FEATURE KEY TO ITS FIRST STEP AND NOTE THAT THE MOTOR HAS NOT BEEN TRIPPED. THE FULL STROKE LINK (8083) MUST STILL HAVE A GOOD HOLD ON THE DRIVE CLUTCH PAWL (2829) (REF. A.) CHECK EACH KEY FOR SAME CONDITION. WITH THE KEY IN THE LOWER LATCHED POSITION, THE FULL STROKE LINK (8083) MUST CLEAR THE DRIVE CLUTCH PAWL (2829) BY AT LEAST .010. ADJUST THROUGH THE ECCENTRIC (REF. C.) ON THE FULL STROKE ARM (2900) OF THE FEATURE KEY LOCK BAR ASSEMBLY (9259). BE SURE THAT THERE IS NO INTERFERENCE (REF. B.) BETWEEN THE CONTINUOUS RUNNING SLIDE (8085) AND THE FULL STROKE LINK (8083) WHEN A FEATURE KEY IS LATCHED DOWN AND THE SLIDE (8085) IS ACTUATED. IT IS NECESSARY TO ADJUST THE REAR END OF LINK (5627) TO TURN ON THE MOTOR SIMULTANEOUSLY WITH THE RELEASE OF THE CLUTCH.



22. FEATURE KEY INTERLOCK

Depress the Total Key - this should lock all other Feature and Digit Keys (except Decimal and Stop Keys). The Interlock is actuated by the movement through the front of the Total and Sub-Total Motor Trip Slide (2388). Adjust through the locking screw (23276) on the left end of the Feature Key Ball Housing Slide (2492), and lock by Nut (M-74429) when the adjustment has been made. Leave .005-.010 end play in Slide (2492).



22. FEATURE KEY INTERLOCK

a) Depress the Total Key - this should lock all other Feature and Digit Keys (except Decimal and Stop Keys).

The Interlock (8631) (Fig. 2) is actuated by the forward movement of the Total and Sub-Total Motor Trip Slide (5645). (Fig. 1)

The Slide (2492) should have .005 to .010 end play. (Fig. 2)

Adjust through the Locking Screw (23260) on the left end of the Feature Key Bail Housing Slide (2492), and lock by Nut (M-74429) when the adjustment has been made. (Fig. 2)

b) With the List Unit restored, the Total Key Interlock (8634) must clear the Total and Sub-Total Motor Trip Slide (5645) by .010 to .015. (Fig. 1)

With the List Unit escaped one or more spaces, the Total Key Interlock (8634) must prevent Total or Sub-Total Key depression by blocking the Slide (5645) with a full hold.

Adjust by forming the Offset (Ref. A) Total Key Interlock (8634). (Fig. 1)

c) With the Total or Sub-Total Key depressed, the Link (5646) must have .010 to .020 further movement.

Adjust by forming the Link (5646). (Ref. B, Fig. 1)

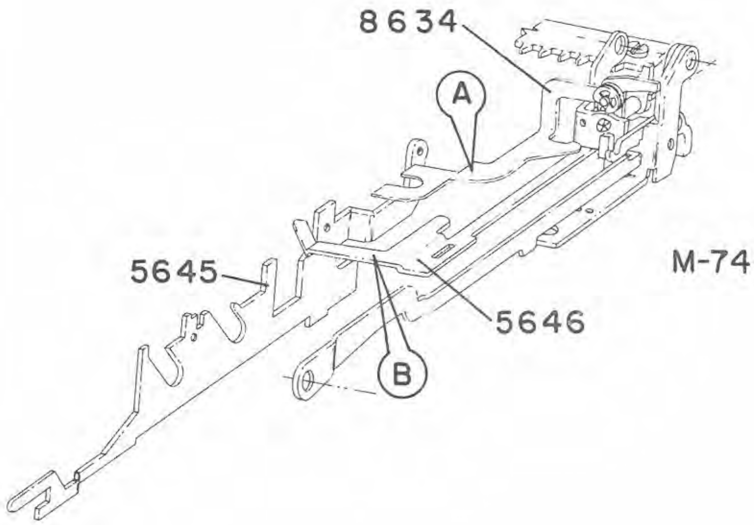


FIGURE 1

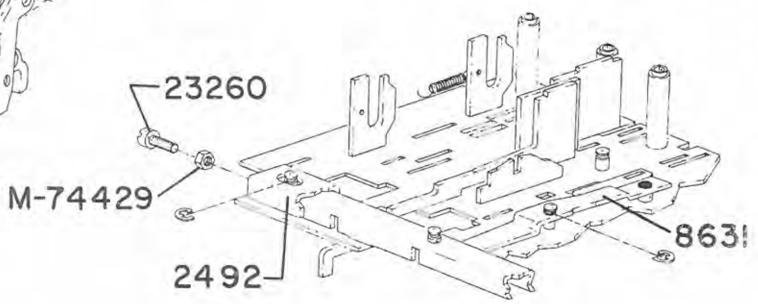
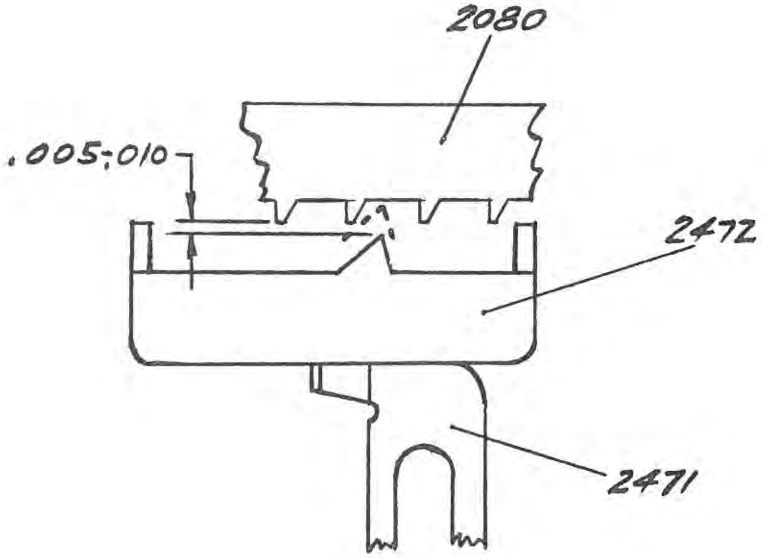


FIGURE 2

23. HALF STEP (YOKE)

a) The point of the Half Step Yoke (2472) and the teeth of the Escapement Rack (2080) must clear at normal condition by .005 - .010. Bend the Finger of the Zero Escapement Slide (2471) which contacts the Yoke (2472) for adjustment. To check the clearance, allow the List Unit to escape far enough to position a tooth on the Rack (2080) in line with the point of the Yoke (2472). Check at both ends and at the center.

b) With the Correction, Total, Sub-total, 0,00,000 Keys held down, the Half Step Yoke (2472) must still have slight further movement. (Recheck after Adj. 23 C,D and E).



23. HALF STEP (0,00,000 KEYS)

c) Depress the 0,00,000 Keys and see that the Finger (8503) clears the teeth of the Escapement Rack (2080) by .005-.010 on the key giving the least movement (Ref. Fig. 2). Adjust through the eccentric in the Zero Escapement Actuating Link (8208) (Ref. Fig. 1). Depress each Zero Key and let it up slowly to see that the Escapement is completed.

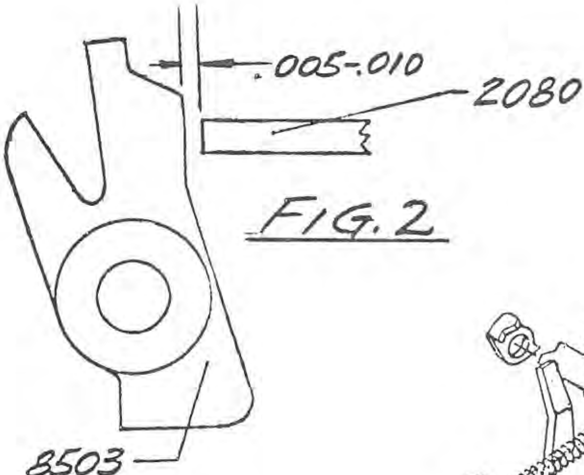


FIG. 2

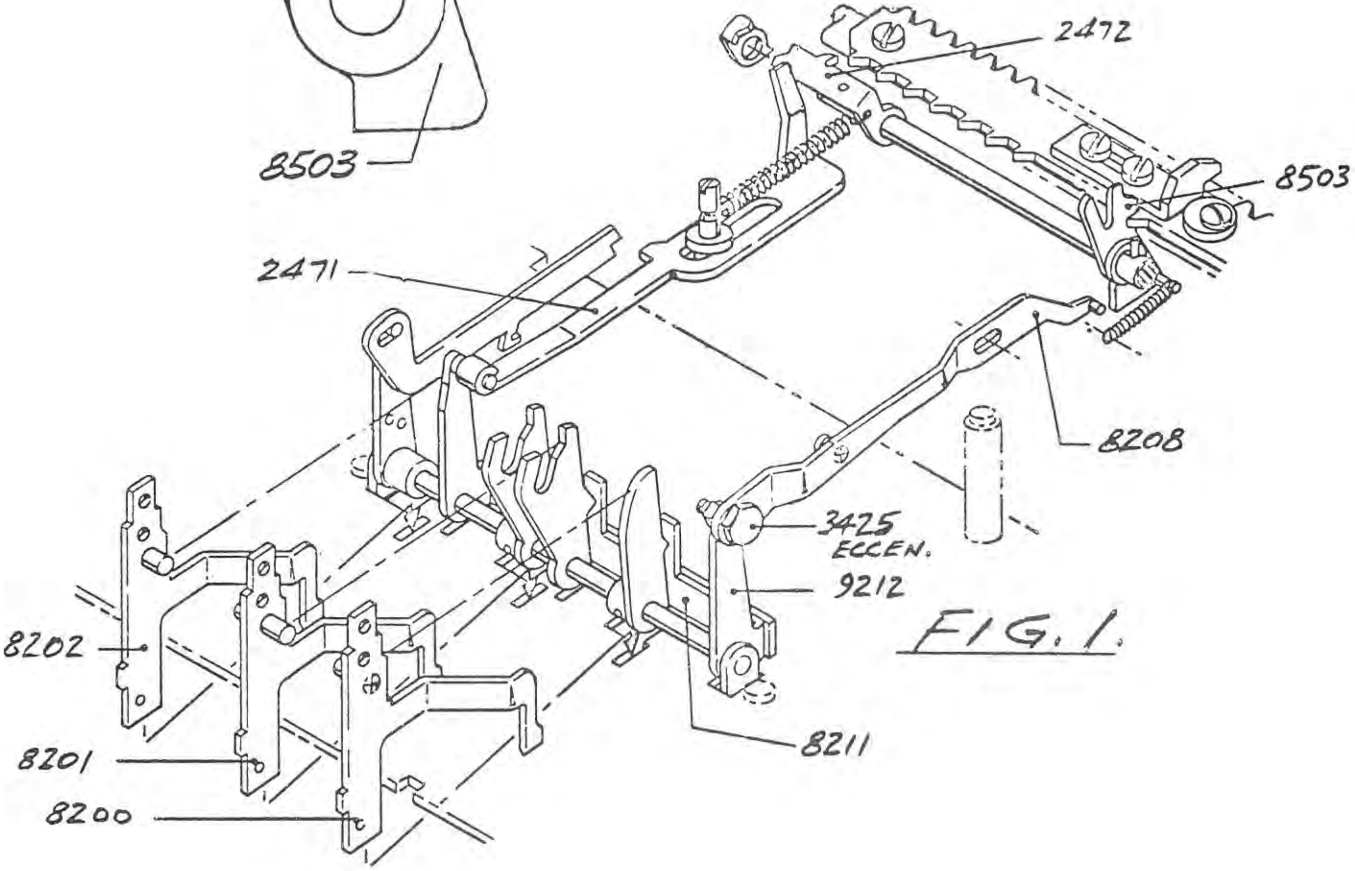


FIG. 1.

23. HALF STEP (CORRECTION AND TOTAL KEYS)

d) Depress the Correction Key slowly and see that the half step escapement takes place before the clutch is tripped. The List Unit must complete half-step movement before machine cycle starts. Adjust by twisting the Correction Key Half Step Actuating Bail (2450) (Ref. Fig. 2) located under the Correction Key. Bail must be free and with the Correction Key fully depressed must not bind. If the Zero Half Step Actuating Bail (8211) does not restore fully, form the tab on the Actuating Bail (2450) (Ref. A. Fig. 2).

e) Depress the Total Key slowly and see that the half step escapement takes place before the Clutch is tripped. The List Unit must complete half step movement before machine cycle starts. Adjust by forming the left extension of the Total Key Half Step Bail (8468) (Ref. Fig. 1) in the upper right hand corner of the keyboard. With the Total Key fully depressed see that the Bail (8468) does not bind. With the Total Key restored the Bail must be free and not have excessive end play, Make same check with Sub-Total.

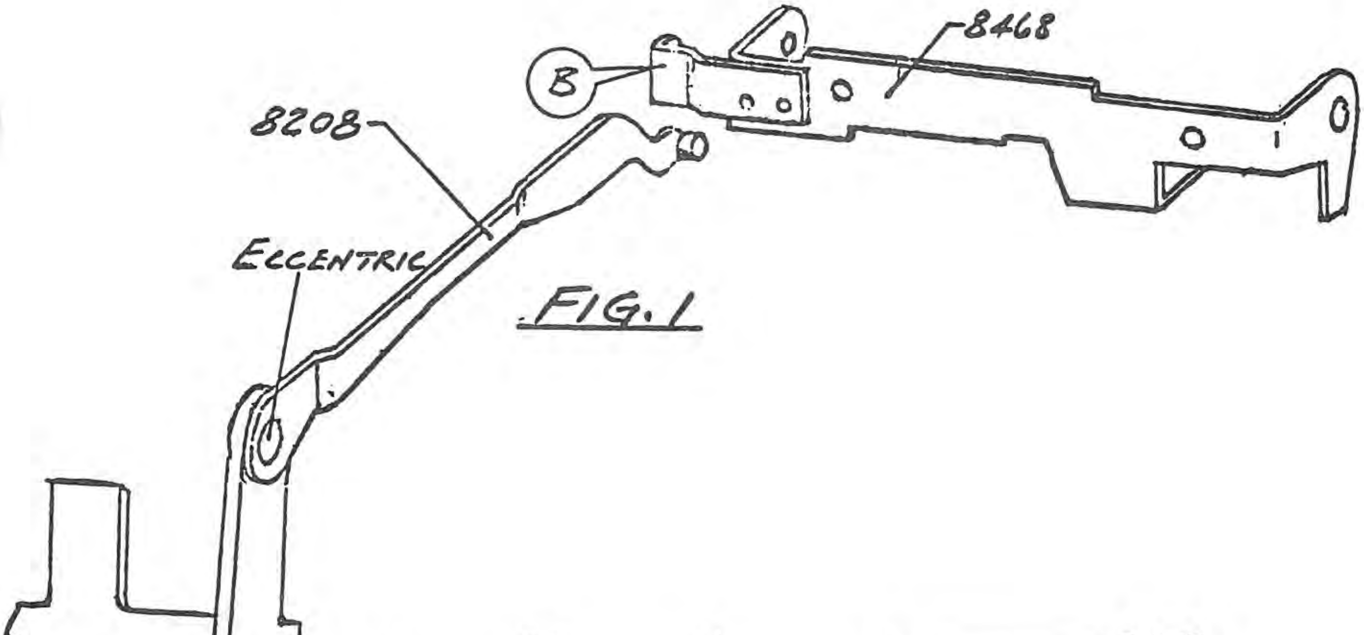


FIG. 1

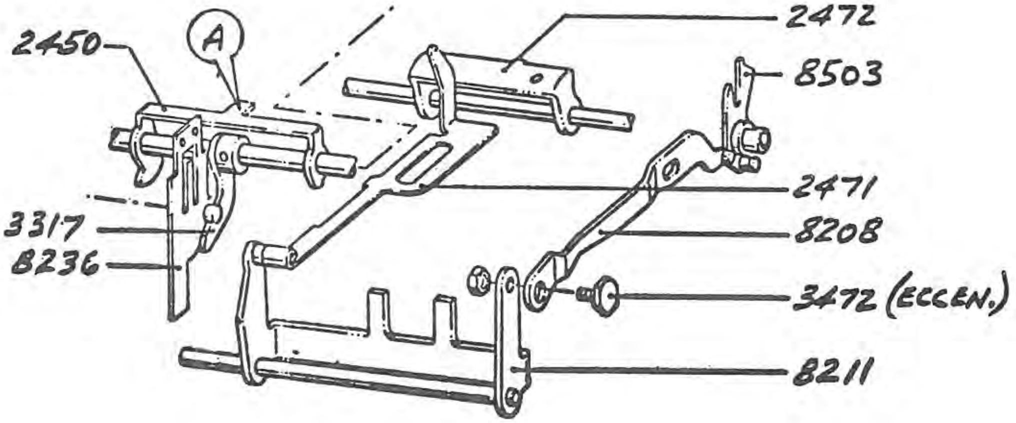


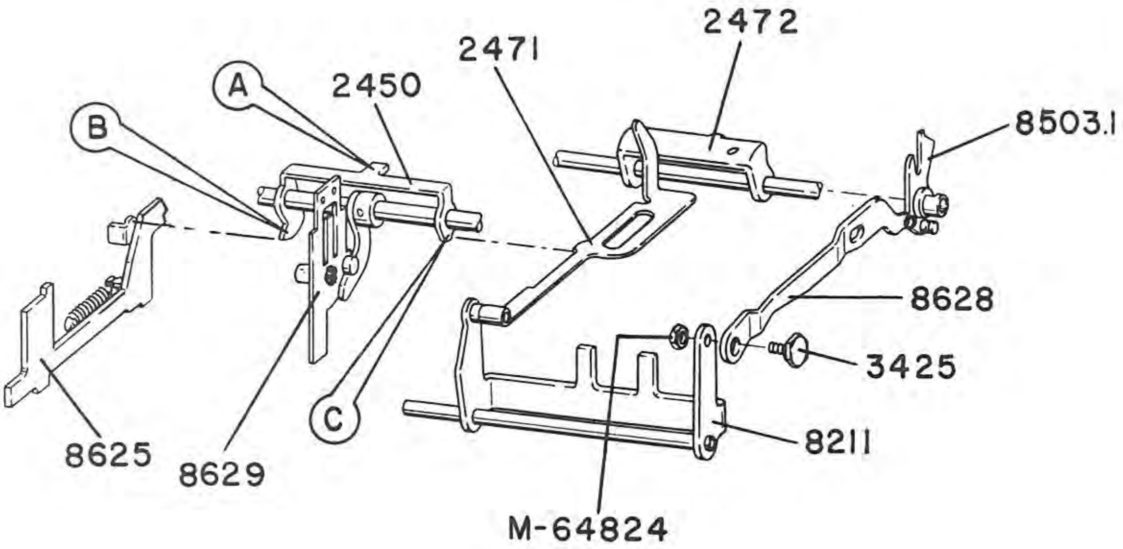
FIG. 2

23. HALF STEP ACTUATING BAIL

a) The Correction Slide (8625) must have slight rearward movement (up to .010) before actuating the Correction Key Half Step Actuating Bail (2450) during multiplication. (Ref. B)

The leg (Ref. C) on the Bail (2450) must not hold the Zero Escapement Slide (2471) rearward to prevent the Zero Half Step Actuating Bail (8211) from fully restoring.

Adjust by forming the tab (Ref. A) or twisting the Bail (2450). (Bail must be free of binds.)



23. HALF STEP

b) With the "0" Key held down, the Half Step Yoke (2472) must have slight further movement (up to .010).

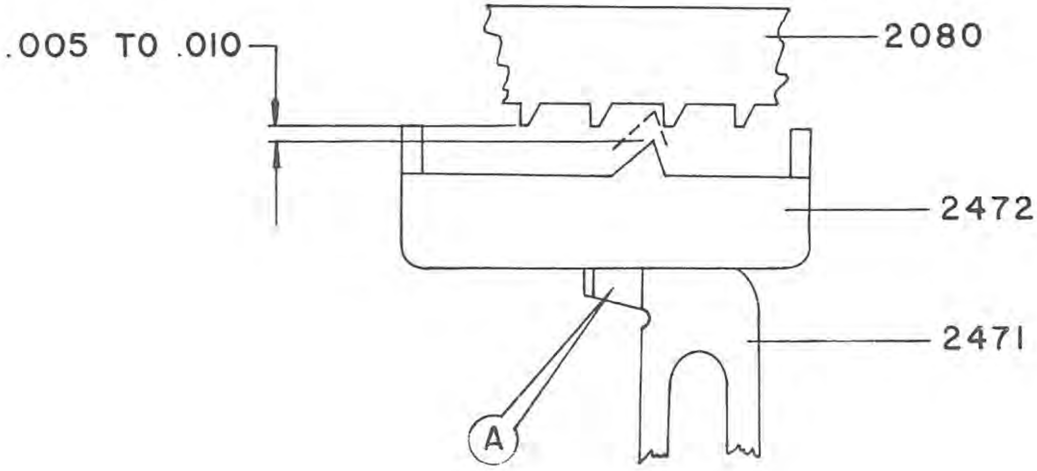
Make same check on "00," and "000" keys.

To adjust, form the finger (Ref. A) on the Zero Escapement Slide (2471) contacting the Half Step Yoke (2472).

c) The point of the Half Step Yoke (2472) must clear the teeth of the Escapement Rack (2080) in normal position by .005 to .010.

To check for clearance, allow the List Unit to escape far enough to position a tooth on the Rack (2080) in line with the point of the Yoke (2472). Check at both ends and at the center.

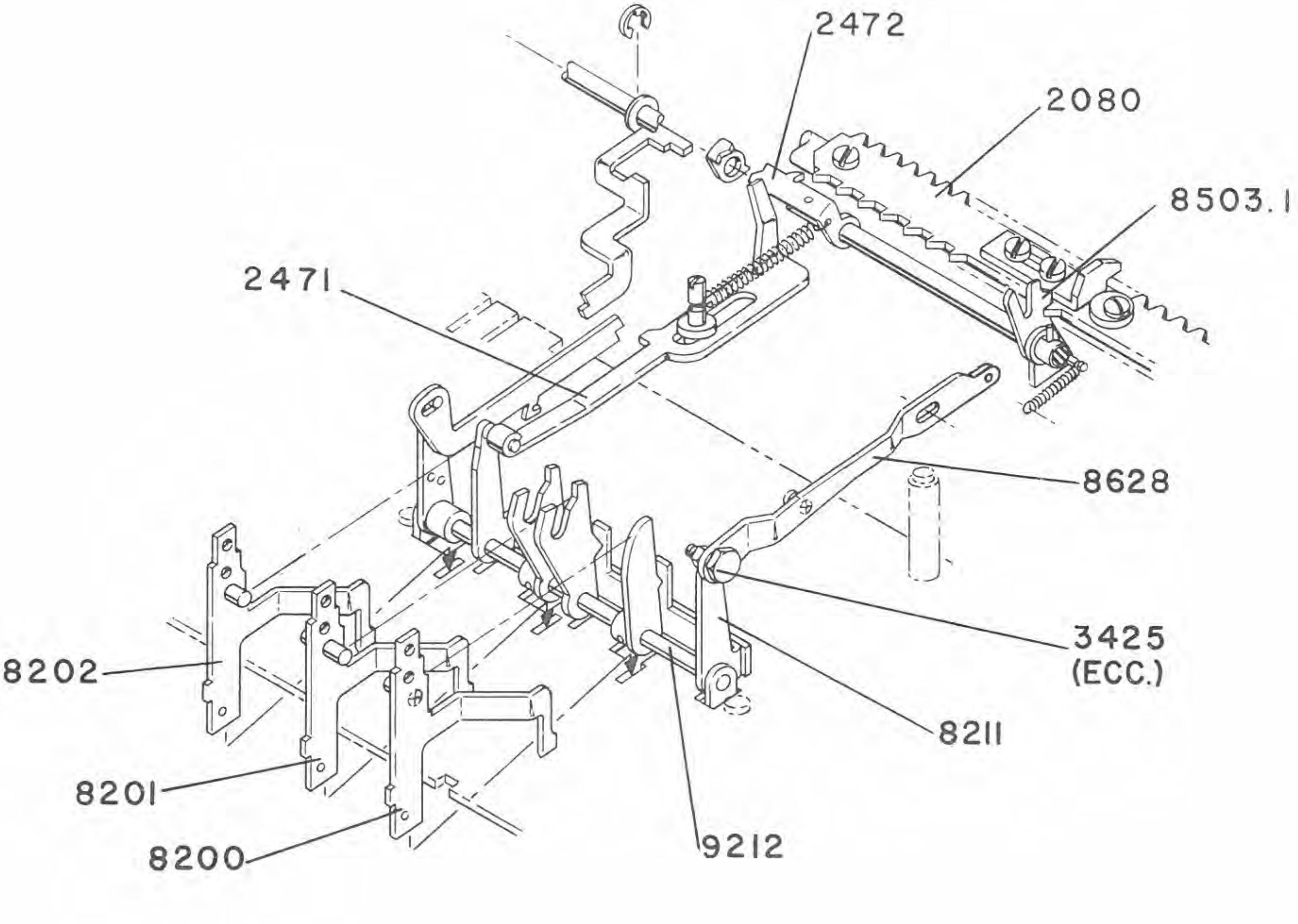
To adjust, form the finger (Ref. A) on the Zero Escapement Slide (2471). (Recheck Adj. 23b)



23. HALF STEP (0, 00, 000 KEYS)

d) Depress the "0" Key. The Escapement Finger (8503.1) must clear the teeth of the Escapement Rack (2080) by .005 to .010. Make same check on "00" and "000" Keys.

Adjust by means of the Eccentric (3425) on the Zero Escapement Actuating Link (8628) for the Zero Key having the least movement.



24. TOTAL KEY HALF STEP BAIL

a) With the machine normal, the end of the Half Step Control Slide (8185) must have a full hold on the tab on the Half Step Bail (8468) (Ref. A. Fig. 1).

b) Depress the Total Key. Turn the Main Shaft and check to see that as the List Unit (now in half step position) moves down, the Escapement Yoke Release (2411) latches over the Digit Key Release Rack (2958) on the List Unit (Ref. A. Fig. 2). As the List Unit moves up, the rear of the Half Step Control Slide (8185) should be lifted high enough by the Rack (2958) to clear the tab on the Half Step Bail (8468) by .005 - .015 to allow the bail to restore before the Total Key is released. To adjust, form the tab (Ref. B. Fig. 2). (Check at both ends and in the middle.) If this forming adjustment is made, recheck Adj. A.

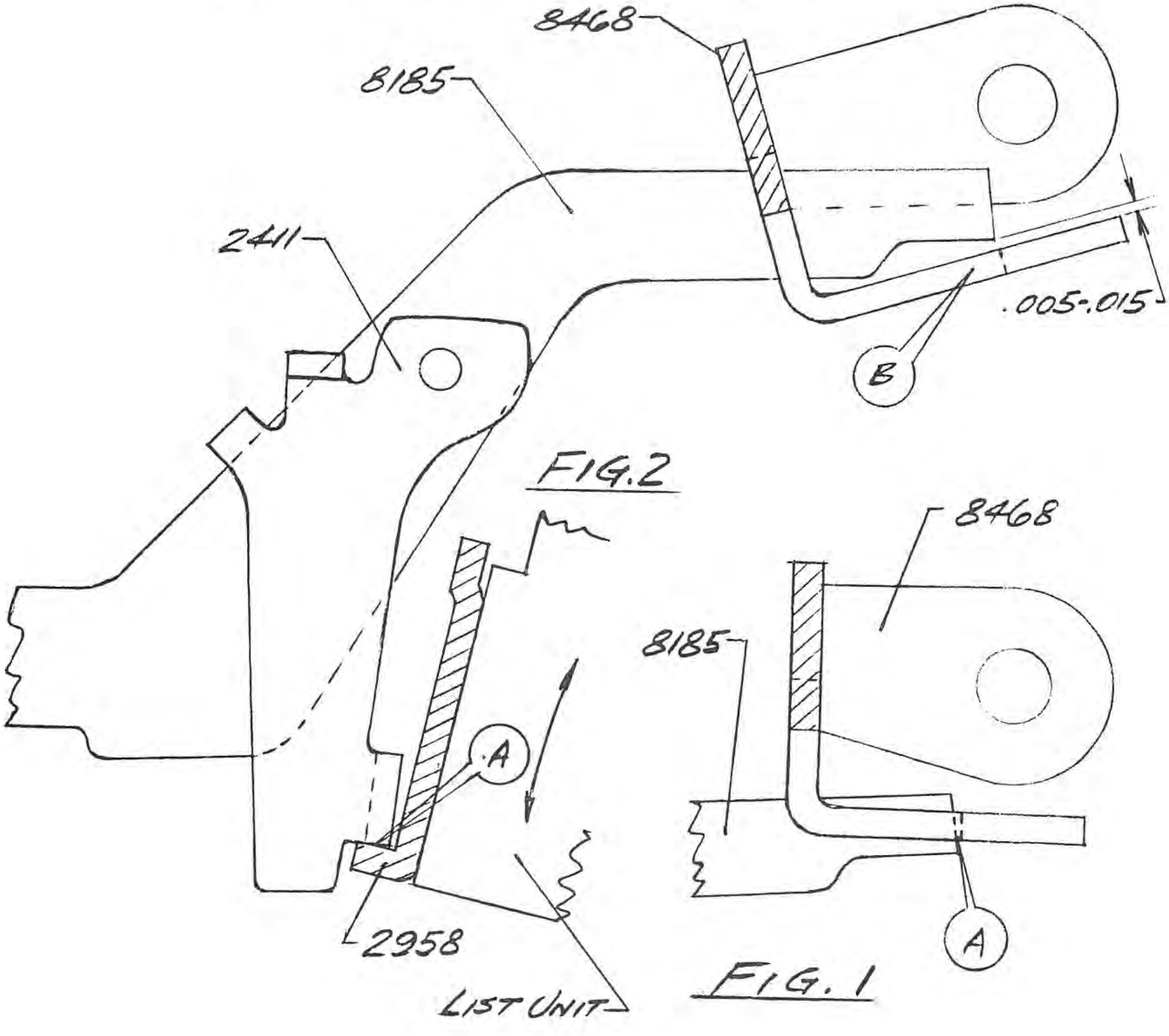
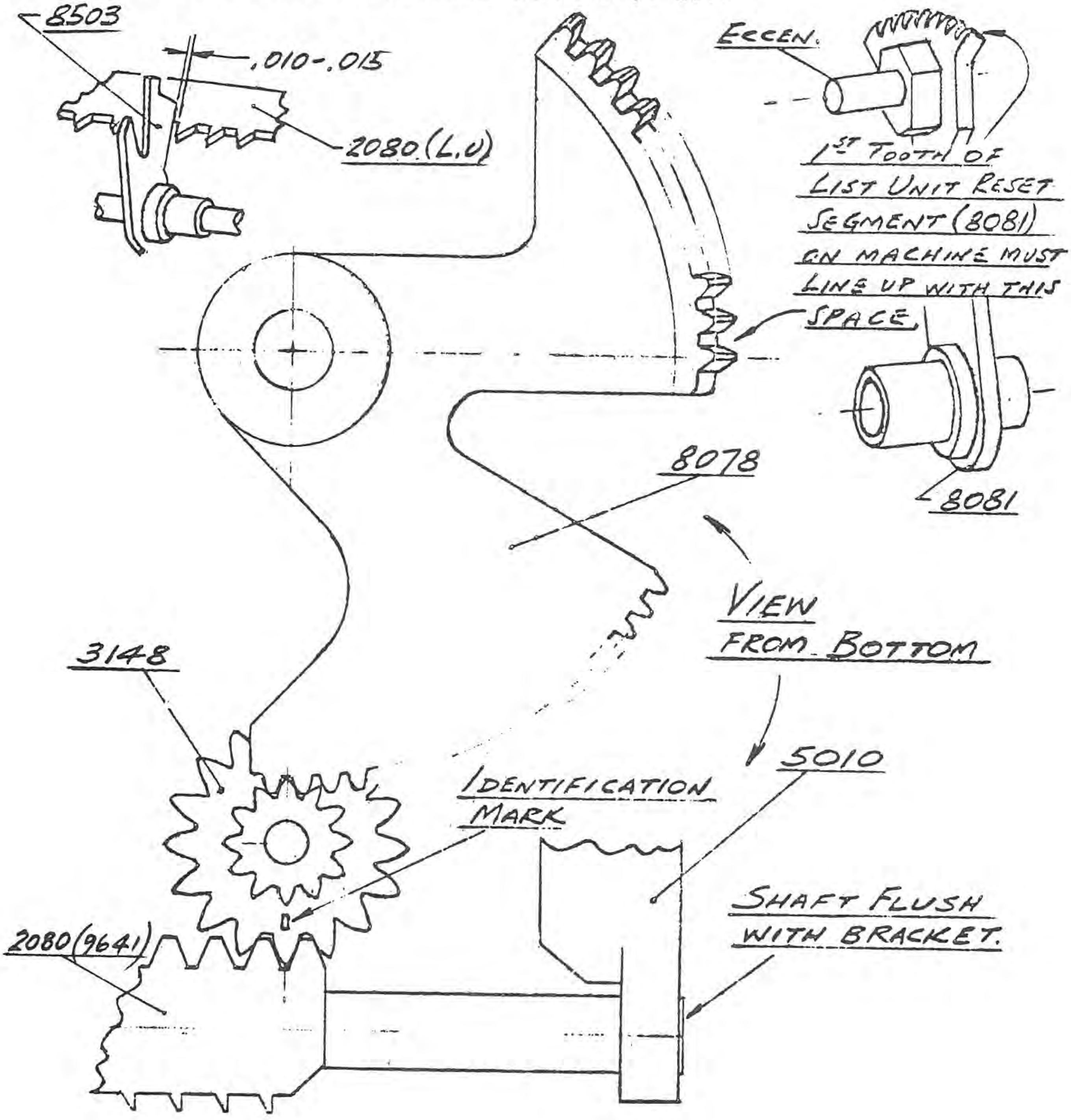


FIG.2

FIG. 1

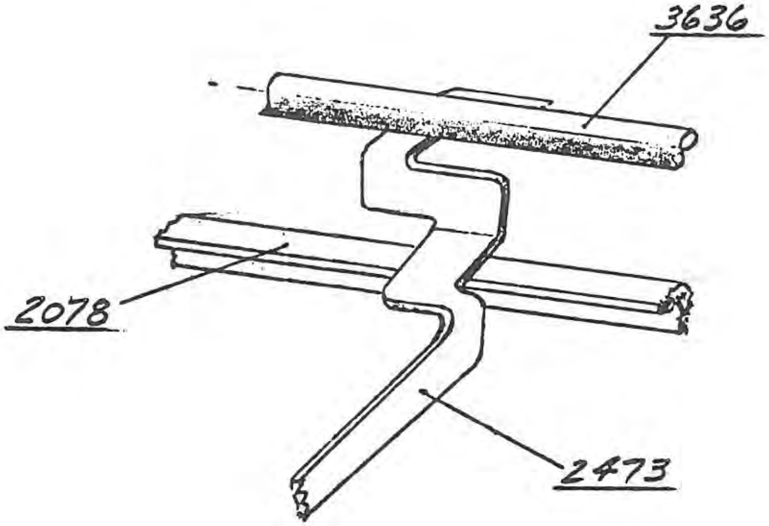
25. LIST UNIT ESCAPEMENT FINGER

Enter several 0's in the keyboard, depress the Add Bar, turn the Main Shaft to see that the List Unit restores .010 - .015 beyond the latching point of the Escapement Finger (8503) with the finger held to the right. Adjust by the eccentric stud in the List Unit Reset Segment (8081). (If the adjustment cannot be made with this eccentric, the Escapement Rack Reset Gear (3148) has not been positioned correctly and must be changed in its position related to the List Unit Reset Rack.) Check to see that the List Unit does not cramp the Automatic Recall Mechanism (Ref. Adj. 35).


8503
.010-.015
2080 (L.U)
ECCEN.
1ST TOOTH OF LIST UNIT RESET SEGMENT (8081) ON MACHINE MUST LINE UP WITH THIS SPACE.
8081
8078
VIEW FROM BOTTOM
3148
IDENTIFICATION MARK
5010
SHAFT FLUSH WITH BRACKET.
2080(9641)

26. HALF STEP YOKE CONTROL LIMIT LINK

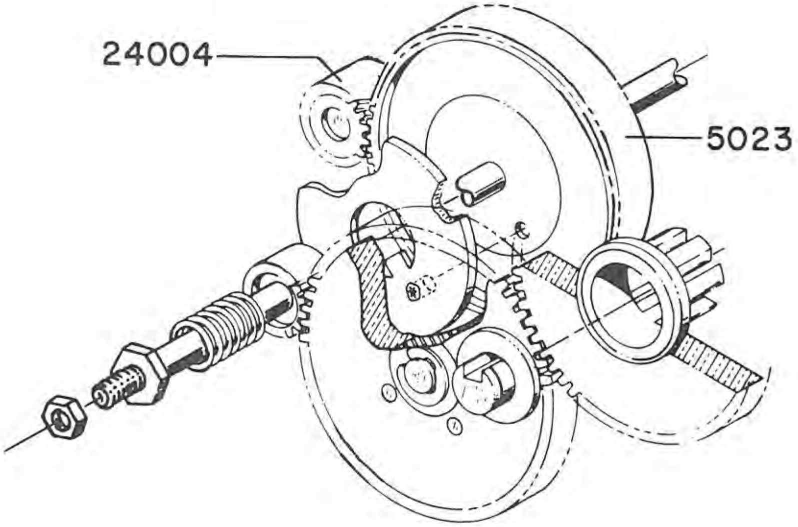
The Half Step Yoke Control Limit Link (2473) passes between the Escapement Shaft (3636) and the List Unit Upper Lock Plate (2078). The Link must be free with no more than .010 up and down movement.



27. MOTOR POSITIONING

a) Check the Motor Drive Gear (Pinion) (24004) to mesh with the Clutch Drive Gear (5023) with as little backlash as possible at the tightest point. To adjust, shift the motor in the left bracket.

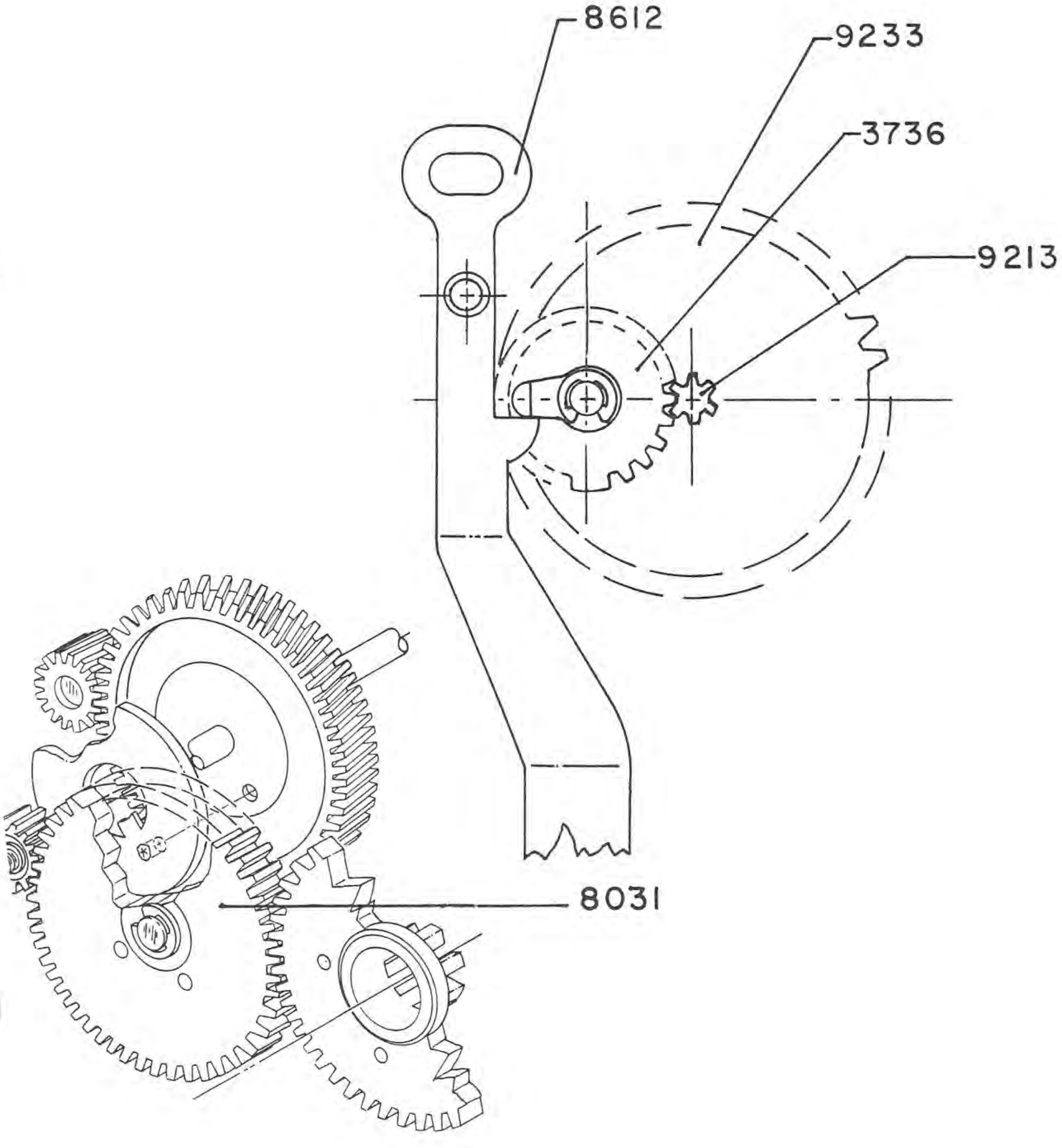
b) Check the Clutch Drive Gear (5023) to have full lateral engagement with the Motor Drive Gear (Pinion) (24004). To adjust, shift the Motor Unit Assembly laterally.



28. DIGIT KEY MOTOR TRIP (SPRING HOUSING)

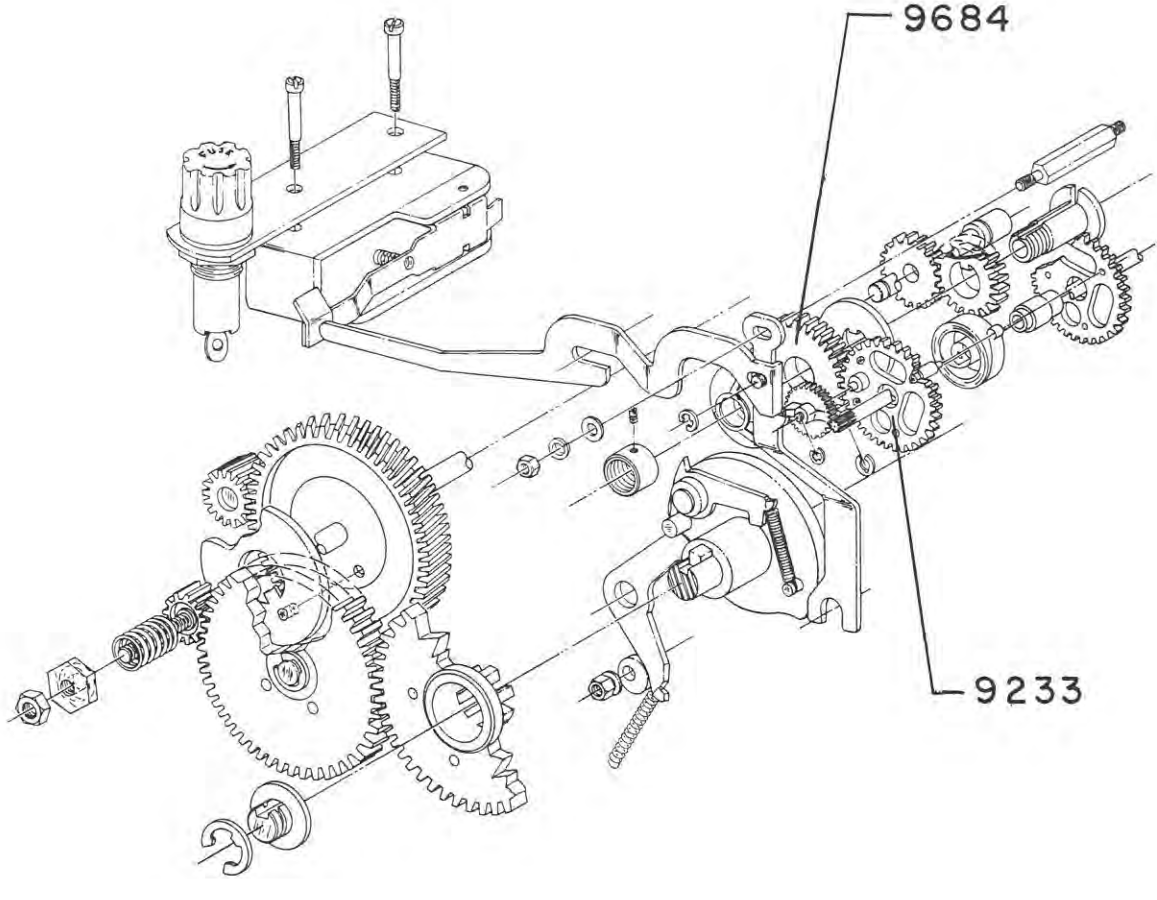
A) THE SPRING HOUSING ASSEMBLY (9233) ON THE LIST UNIT CONTROL SHAFT (9213) MUST HAVE FOUR TURNS COUNTERCLOCKWISE AND THE REWIND LIMIT GEAR (3736) MUST BE ASSEMBLED ON THE STUD SO THAT THERE ARE FOUR EMPTY TOOTH SPACES FROM THE WIDE TOOTH TO THE GEAR ON THE END OF THE CONTROL SHAFT (9213) - THE FIFTH TOOTH ON THE REWIND LIMIT GEAR (3736) MESHING WITH THE GEAR ON THE SHAFT (9213).

IF CHECK OF THIS ASSEMBLY IS FOUND NECESSARY DUE TO OPERATIONAL DIFFICULTIES, REMOVE THE IDLER GEAR (8031) AND THE REWIND LIMIT GEAR (3736) WHILE HOLDING THE SPRING HOUSING ASSEMBLY (9233). ALLOW THE SPRING HOUSING TO UNWIND SLOWLY AND COUNT THE NUMBER OF TURNS.



28. DIGIT KEY MOTOR TRIP (SPRING HOUSING)

B) ROTATE THE LIST UNIT CONTROL (INPUT) SHAFT SPRING HOUSING (9233) UNTIL THE MOTOR STARTS AND LET IT RETURN SLOWLY TO SEE THAT THE LIST UNIT CONTROL (INPUT) SHAFT SPRING HOUSING (9233) UNDER SPRING TENSION WILL FULLY RESTORE. FOR ADJUSTMENT, TIGHTEN THE COLLAR ON THE DRIVE CLUTCH SPRING HOUSING (9684) AND TIGHTEN THE SET SCREW.



28. DIGIT KEY MOTOR TRIP

c) Hold the Rewind Gear from turning and hold the # 7 Key depressed.

Manually turn the Rewind Gear (9233.1) counterclockwise and as the rounded lug on the Limit Gear (3736) passes the lip on Link (8612) there must be a noticeable bite or bind.

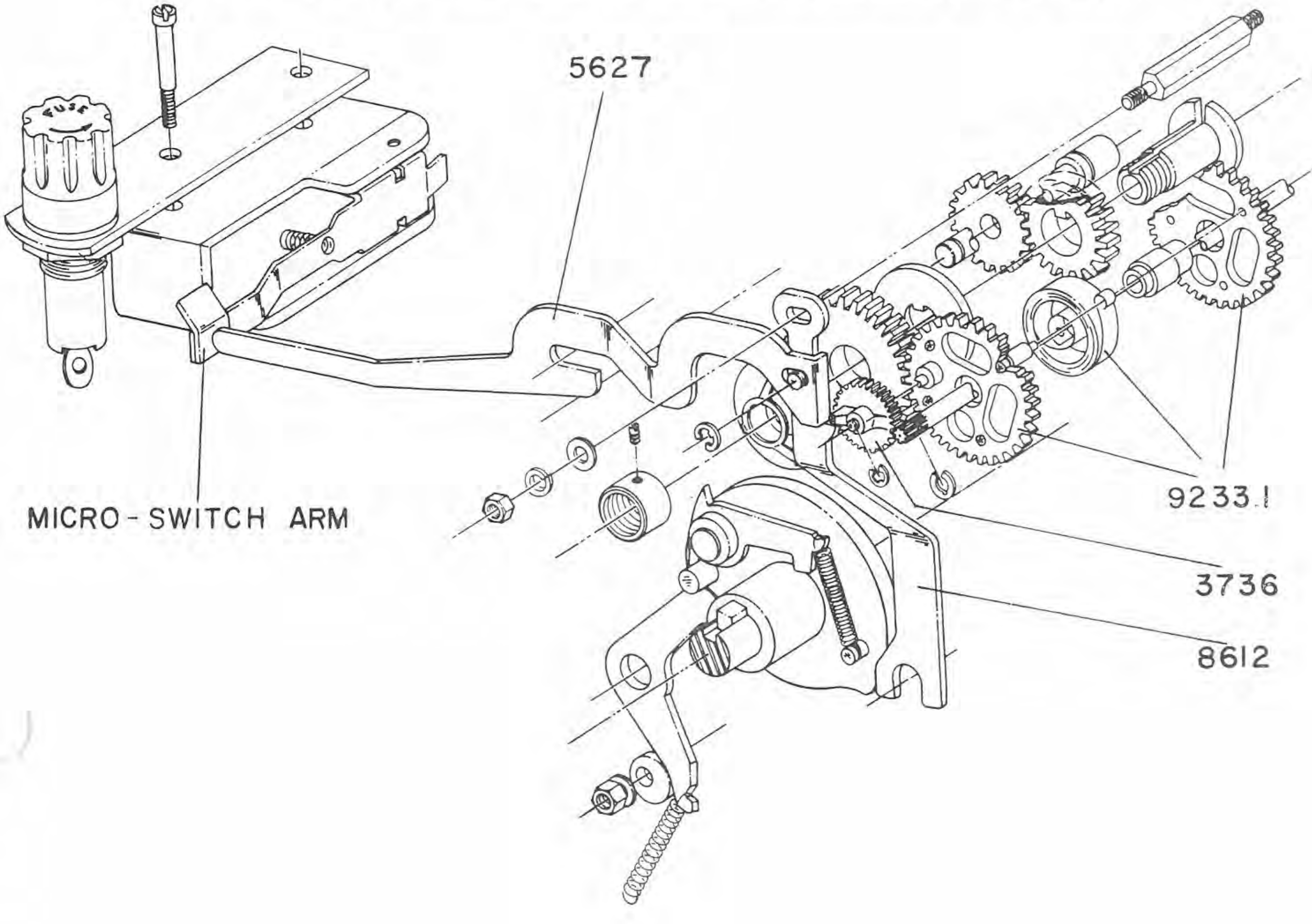
Adjust by positioning the Link (8612) forward or rearward.

(Check for at least .020 clearance between the stud in Link (8612) and the end of the slot in the Motor Trip Link (5627) just as the motor starts while rotating the Rewind Gear (9233.1) slowly clockwise. (Try # 7 Key in normal manner to be sure that the lug on Limit Gear (3736) passes the lip on Link (8612) without hanging up).

d) Check for the motor to trip when Keys # 1 through # 6 are released and at full depression of Keys # 7 through # 9.

However, the motor may start at full depression of # 6 and # 5 Keys but with Keys held depressed the motor must not continue cycling.

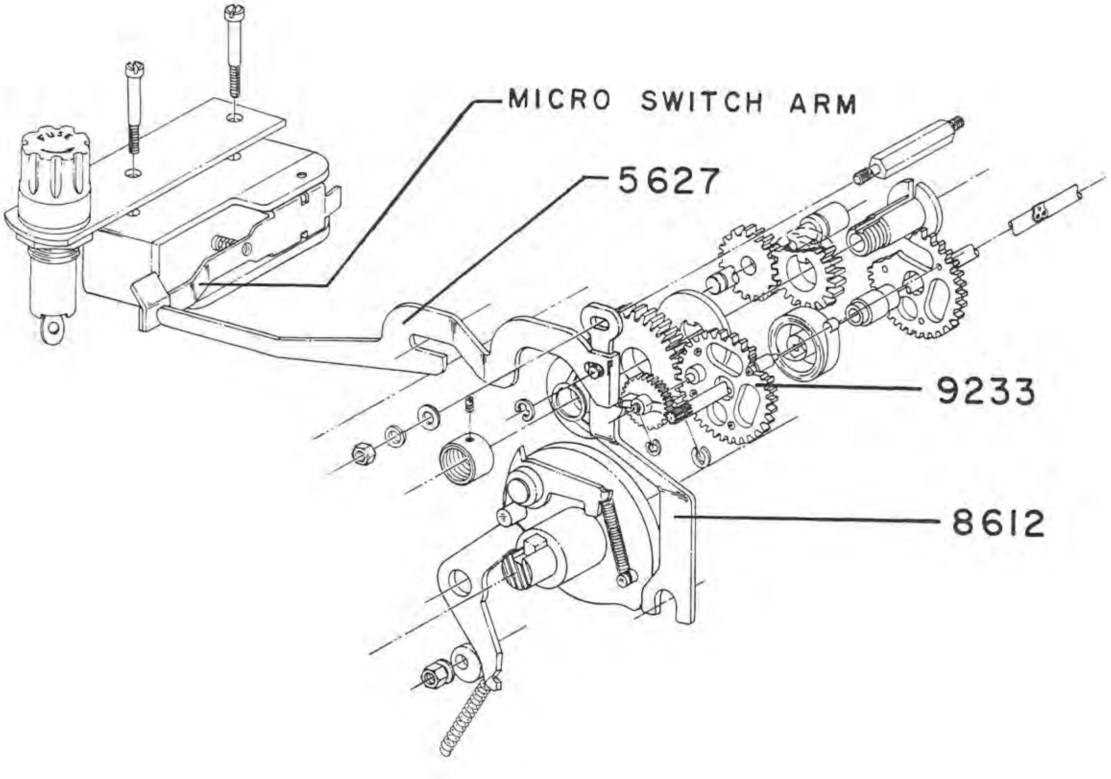
Adjust by forming the Microswitch arm rearward or forward as required. (Further adjustment of Microswitch arm is required if motor starts with depression of # 4 Key).



28. DIGIT KEY MOTOR TRIP

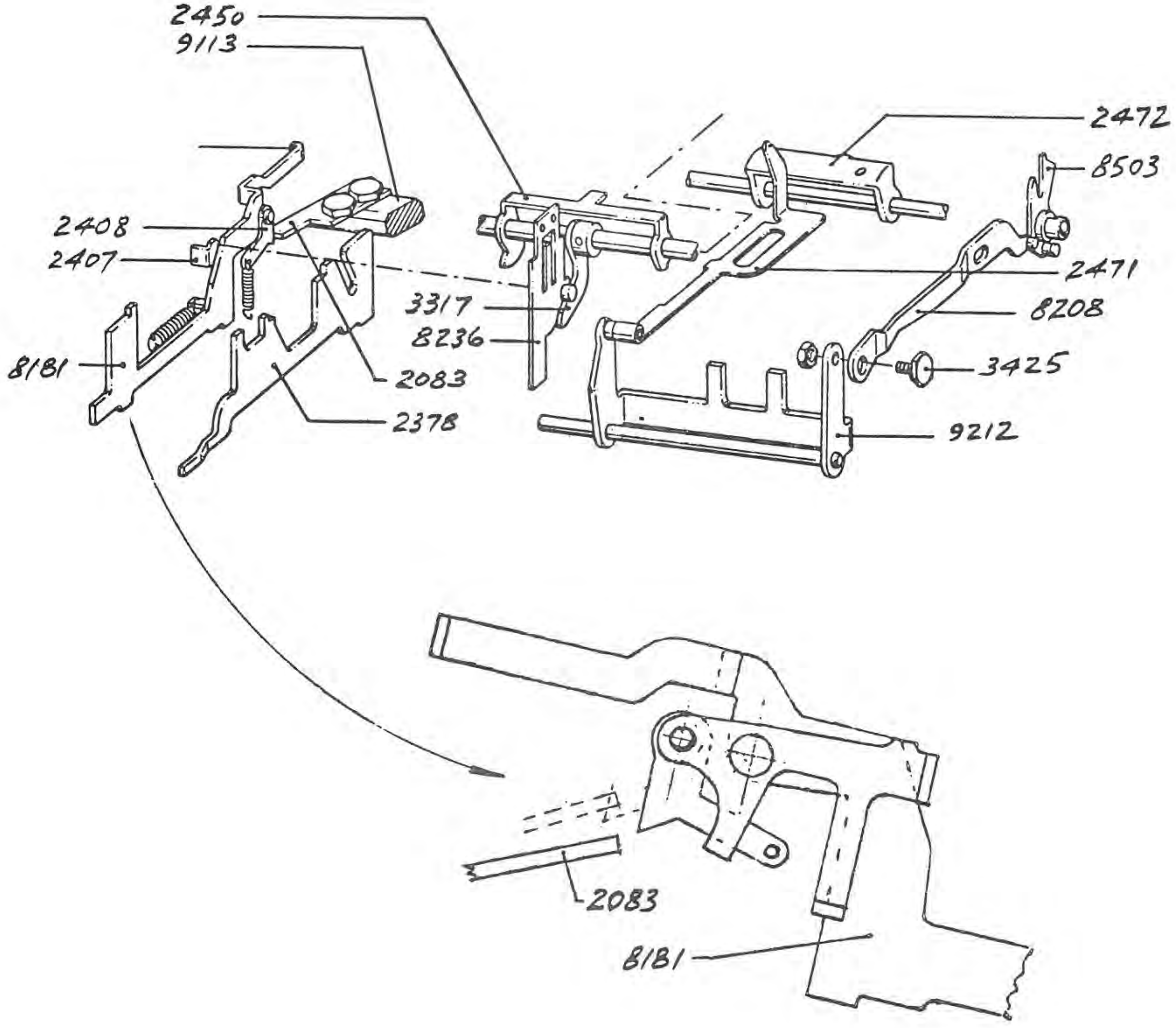
C) CHECK FOR THE MOTOR TO TRIP WHEN THE DIGIT KEYS 1 THROUGH 6 ARE RELEASED AND AT FULL DEPRESSION OF THE KEYS 7 THROUGH 9. MOVE THE LIST UNIT CONTROL (INPUT) SHAFT REWIND GEAR STUD LIMIT LINK (8612) TO THE REAR OR TO THE FRONT FOR ADJUSTMENT.

D) ROTATE THE SPRING HOUSING ASSEMBLY (9233) SLOWLY CLOCKWISE UNTIL THE MOTOR JUST STARTS. AT THIS TIME CHECK FOR AT LEAST .020 CLEARANCE BETWEEN THE STUD IN LINK (8612) AND THE END OF THE SLOT IN MOTOR TRIP LINK (5627). HOLDING THE #6 DIGIT KEY IN THE DEPRESSED POSITION THE MOTOR SHOULD NOT CONTINUE CYCLING. TO ADJUST FORM MICRO SWITCH ARM TOWARD REAR OR FRONT. LINK (5627) MUST BE FREE. (RE-CHECK ADJUSTMENT 21).



29. CORRECTION KEY RELEASE PLATE

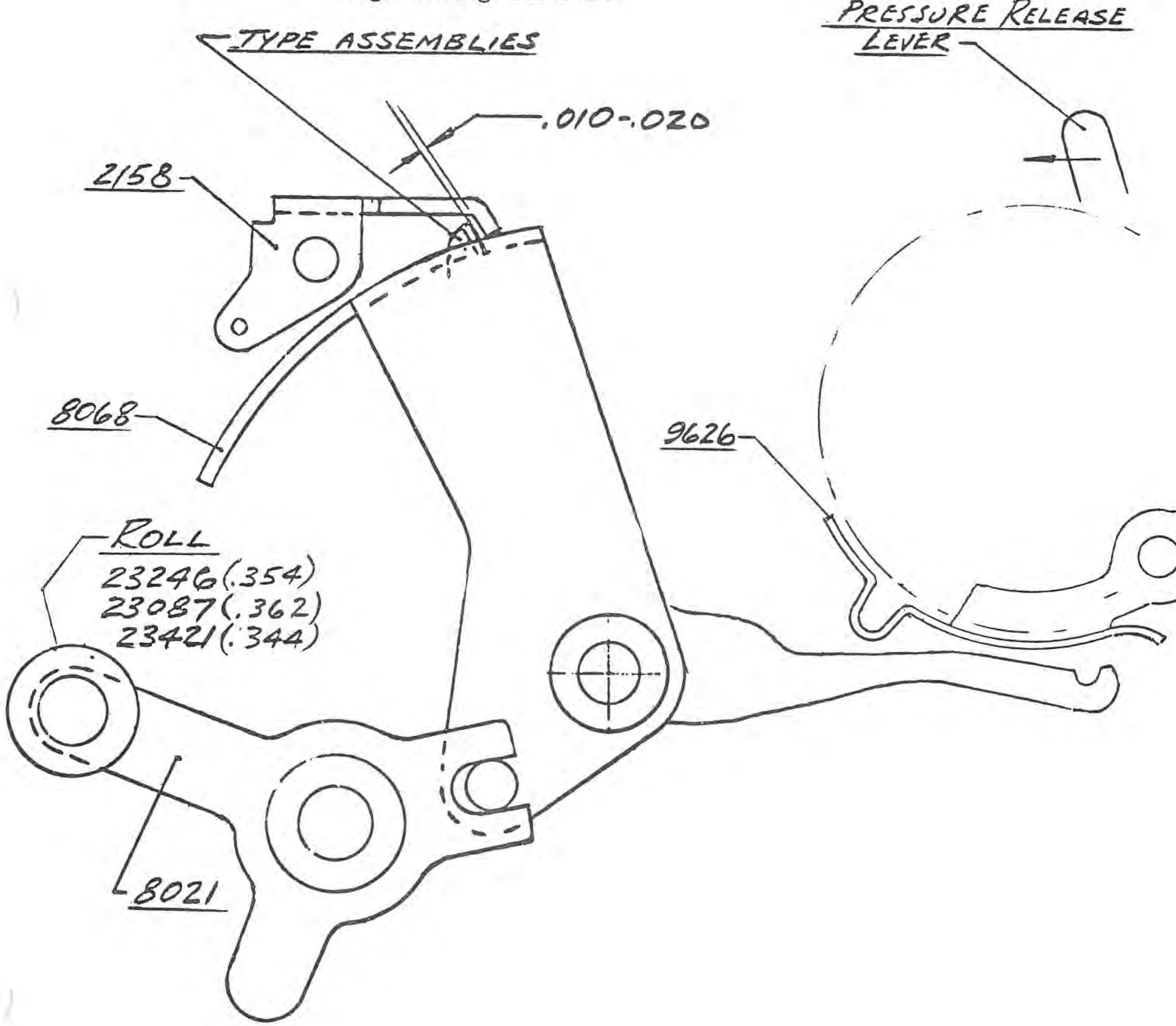
Depress the Correction Key, turn the Main Shaft and check to see that as the List Unit goes into mesh, the latch on the Correction Slide (8181) latches over the Correction Key Release Plate (2083) on the List Unit. As the List Unit returns to upper position, the Correction Key Release Plate (2083) should lift the Correction Key Slide (8181) high enough to release the Half Step Yoke (2472). For adjustment, form the Correction Key Release Plate (2083) on the List Unit.



30. TYPE GUIDE COMB

As the Type Guide Comb Assembly (8068) restores all the type assemblies and the Type Firing Plate (2158) drops, there must be .010 to .020 further movement of the Guide Comb (8068). Adjust by changing the roll on the Type Comb Bellcrank (8021).

NOTE: Excessive clearance may result in interference between the Type Assembly Arms and the Paper Cradle Assembly (9626). With the machine normal and the Pressure Release Lever set forward it must be possible to pull the Type Guide Comb forward an additional amount without interference. It is advisable to position the Carriage Frame on the Backplate as high as possible by pulling up on the carriage when tightening screws.



31. RECALL UNIT MESH

a) Check the Recall Unit Lifting Bellcrank (8438) to lift the Recall Unit into mesh with the Racks with .005 to .010 play (Ref. Fig. 1). Adjust through the Eccentric Bushing (3598).

b) With the Recall Unit out of mesh there should be .010 - .015 clearance between the Recall Unit Lifting Bellcrank (8438) and the Recall Unit (Ref. Fig. 1). Adjust with the Eccentric (Ref. Fig. 2). For correct position of the Recall Unit Drive Gear (2888) - (Ref. Fig. 3).

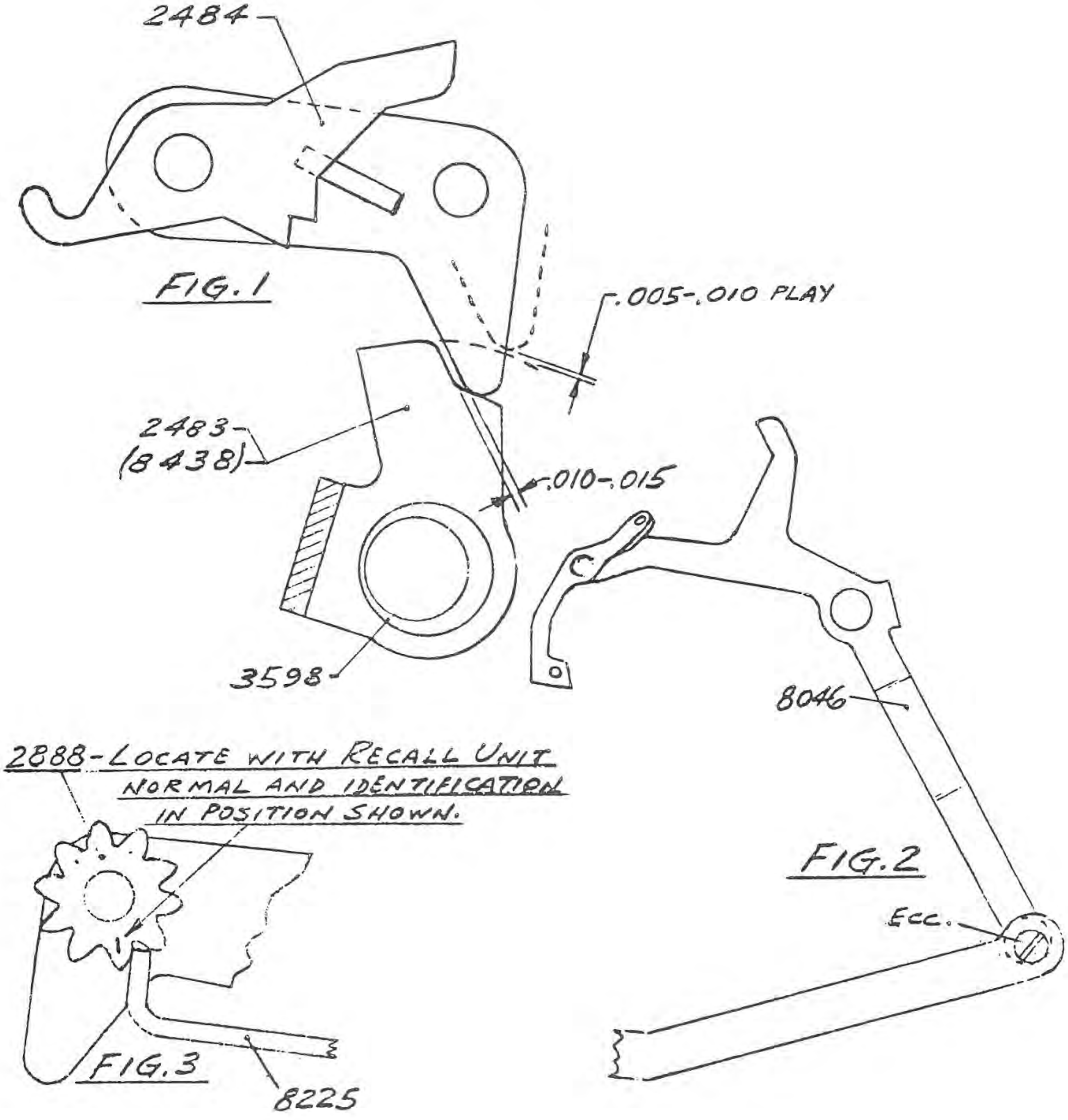


FIG. 1

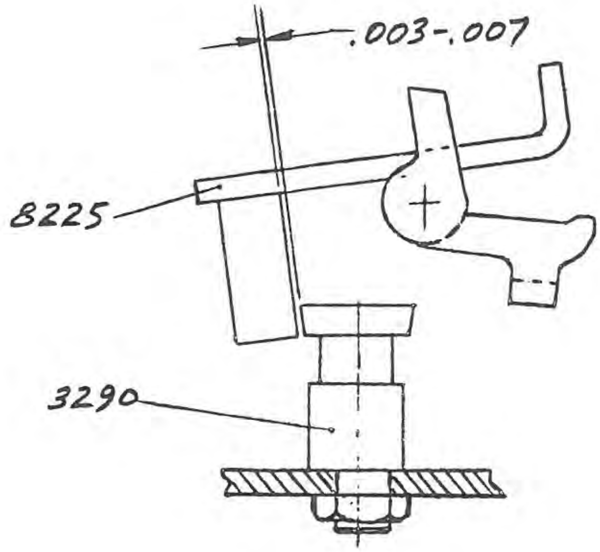
FIG. 2

2888 - LOCATE WITH RECALL UNIT NORMAL AND IDENTIFICATION IN POSITION SHOWN.

FIG. 3

32. RECALL UNIT (LIMIT STUD)

Adjust Limit Stud (3290) in the Front Bottom Plate (8284) to clear the square stud of the Recall Unit Lock Plate (8225) by .003-.007 in normal.

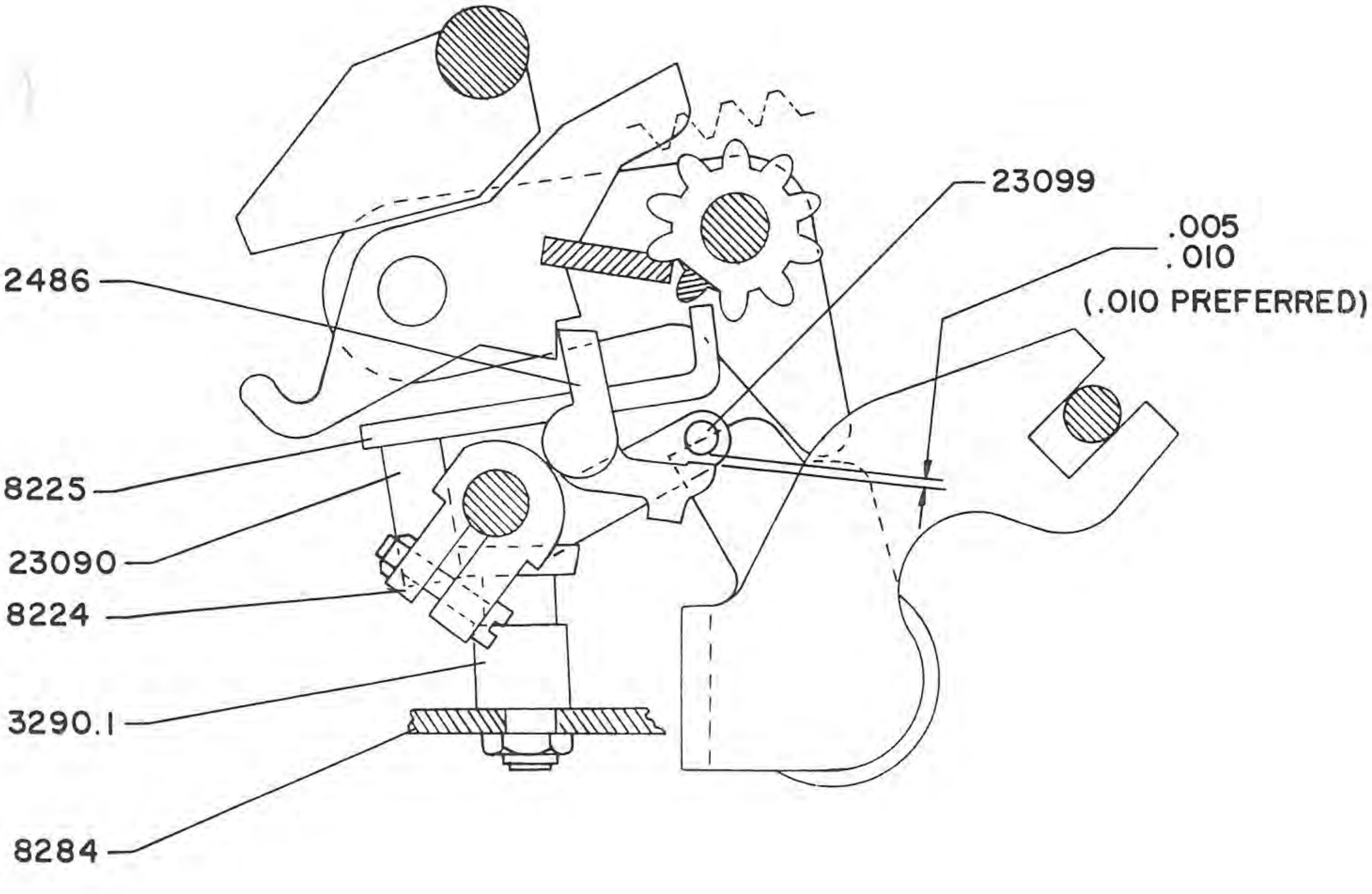


33. RECALL UNIT

With the Square Stud (23090) in the Recall Unit Latch Plate (8225) limiting against the Stud (3290.1) in the Front Bottom Plate (8284), the Stud (23099) in the Storage Control (8224) must clear the Lock Plate Lift Cam Latch (2486) by .005-.010 (.010 preferred) and be aligned with it.

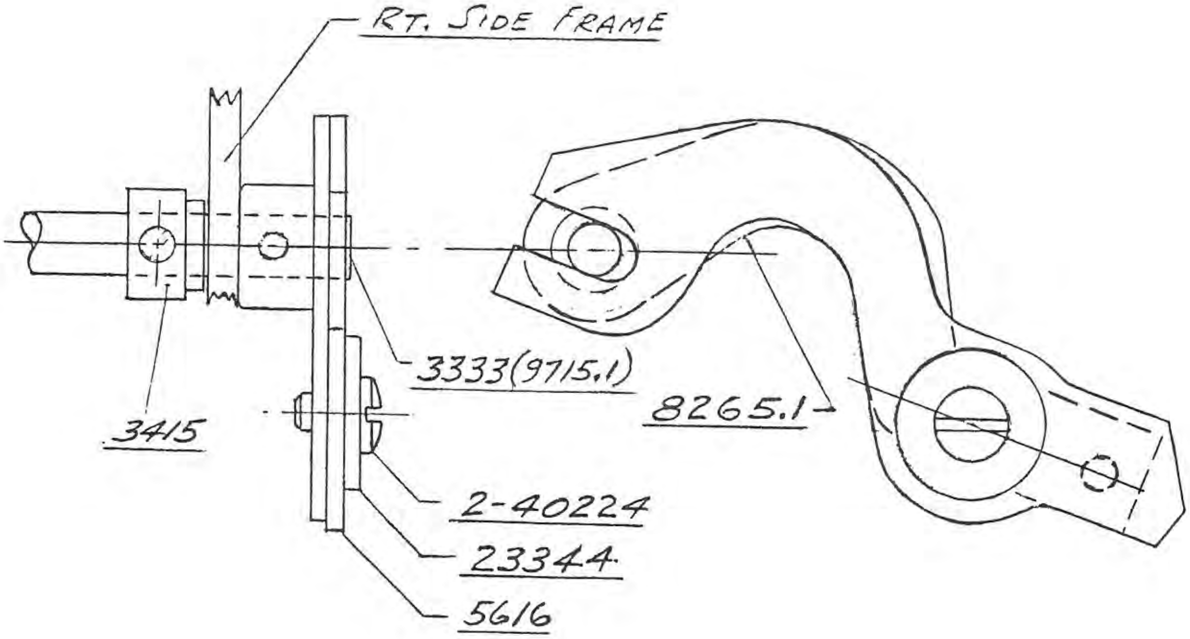
Check with machine upside down - do not pick up Recall Unit to make this check.

To adjust, set the Storage Control (8224) friction tight on the shaft to allow it to slip. (Access slot to clamp screw is provided in the Front Bottom Plate (8284). Position it to the required specifications and tighten securely.



34. RECALL UNIT CONTROL

Check the Shaft end play of the Recall Unit Control Shaft Assembly (9715.1), on the front of the machine, for .005-.010. Adjust through the Multiply Recall Shaft Set Collar (3415).



35. AUTOMATIC RECALL CONTROL

a) With the List Unit escaped one or more spaces and the Recall Unit Control Latch Assembly (8342) stopped against the Recall Unit Control Bracket Assembly (8197) check for slight play in the Auto Recall Latch Act. Yoke (2687). (Ref. Fig 1 and Fig 3). To adjust, form the tab on the Act. Yoke (2687) (Ref. A. Fig 2).

b) Check for at least .020 clearance between the Return Stroke Bar (8040), the Forward Stroke Bar (8036) and the Recall Actuator Hooks (2712 and 2713). (Ref. Fig 4). To adjust, form the ear on the Recall Unit Control Latch Assembly (8342) (Ref. B Fig. 3).

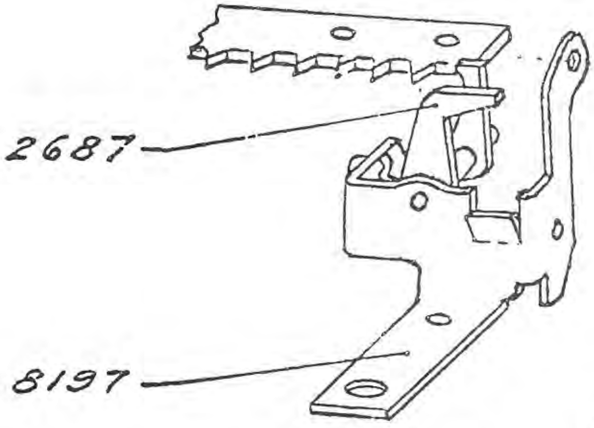


FIG. 1

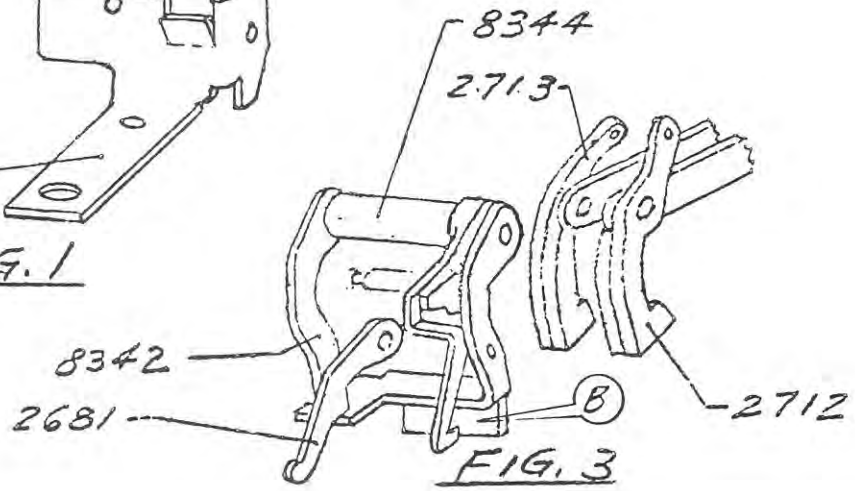


FIG. 3

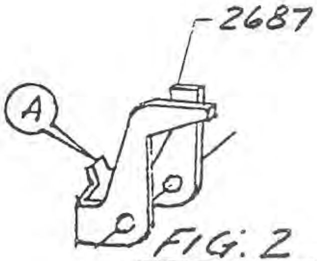


FIG. 2

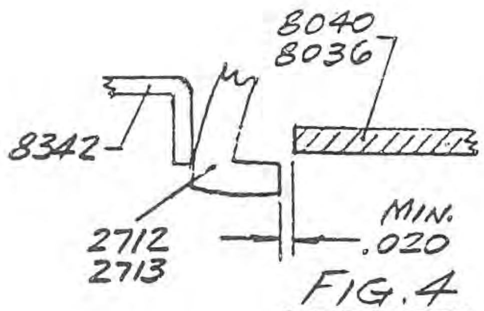


FIG. 4

35. AUTOMATIC RECALL CONTROL

c) Depress the Multiply Key a second time with no item in the keyboard, turn the Main Shaft slowly to see that the Auto Recall Latch (2681) of the Auto Recall Control Assembly (9248), in the upper right hand corner of the keyboard, drops into latch position with at least .008 overthrow and with no bind. (Ref. Fig. 1). Adjust by forming the end of the Auto Recall Multiply Cutoff Link (2684). (Ref. B. Fig. 2). (When Latch (2681) is latched on the bracket (8197), there should be at least .020 clearance between the hooks (2712 and 2713) and the bars (8036 and 8040) (Ref. Fig. 3).

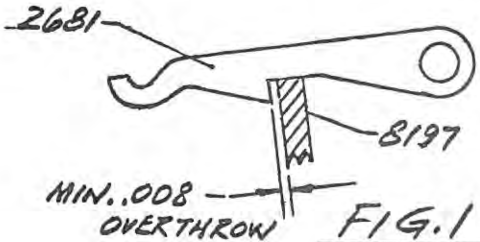


FIG. 1

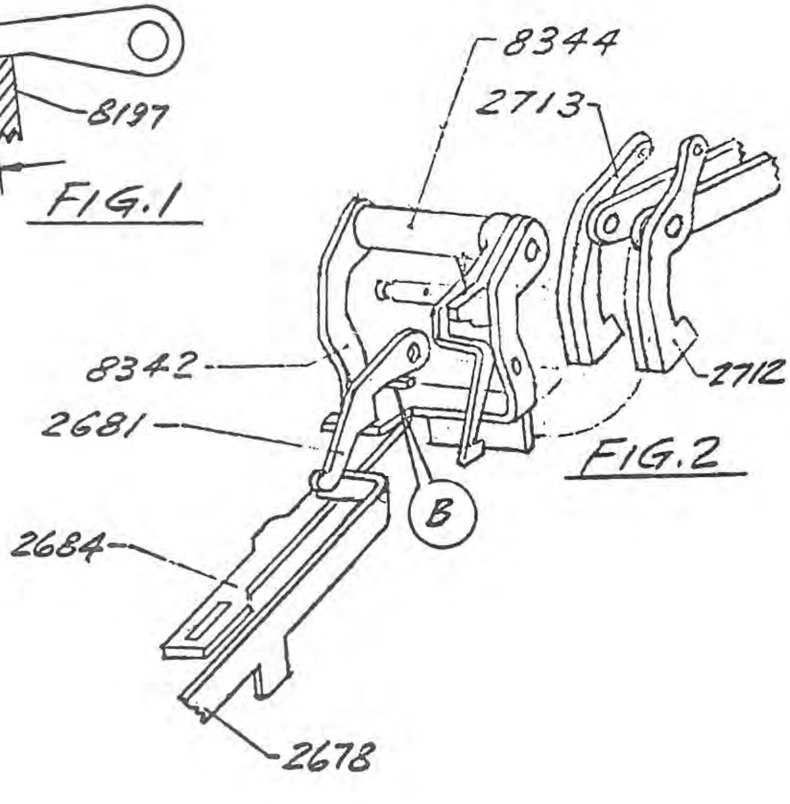


FIG. 2

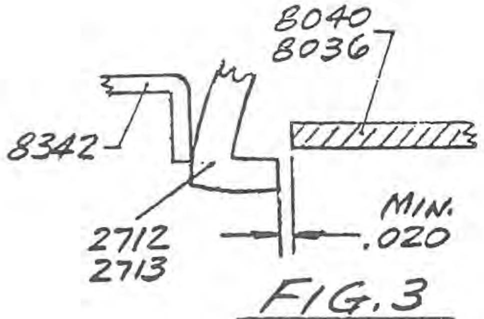


FIG. 3

35. AUTOMATIC RECALL CONTROL

d) Latch the storage key down to move the Slide (8187) out of contact with the Recall Return Stroke Actuator Hook (2712). With the List Unit fully restored, check the Recall Actuator Hooks (2712 and 2713) to have .075 - .100 engagement with the Return Stroke Bar (8040) and the Forward Stroke Bar (8036). (Ref. Fig. 3). To adjust, twist the bridge of the Auto Recall Latch Actuator Yoke (2687) (Ref. Fig. 1).

e) When the Main Shaft is normal, after the last stroke of the Multiply Operation, the Latch (2681) should be held .005 - .015 above its Latching Point. (Ref. Fig. 4). Adjust by forming Auto Recall Latch Release Link (2678) (Ref. Fig. 4 and Ref. C. Fig. 2).

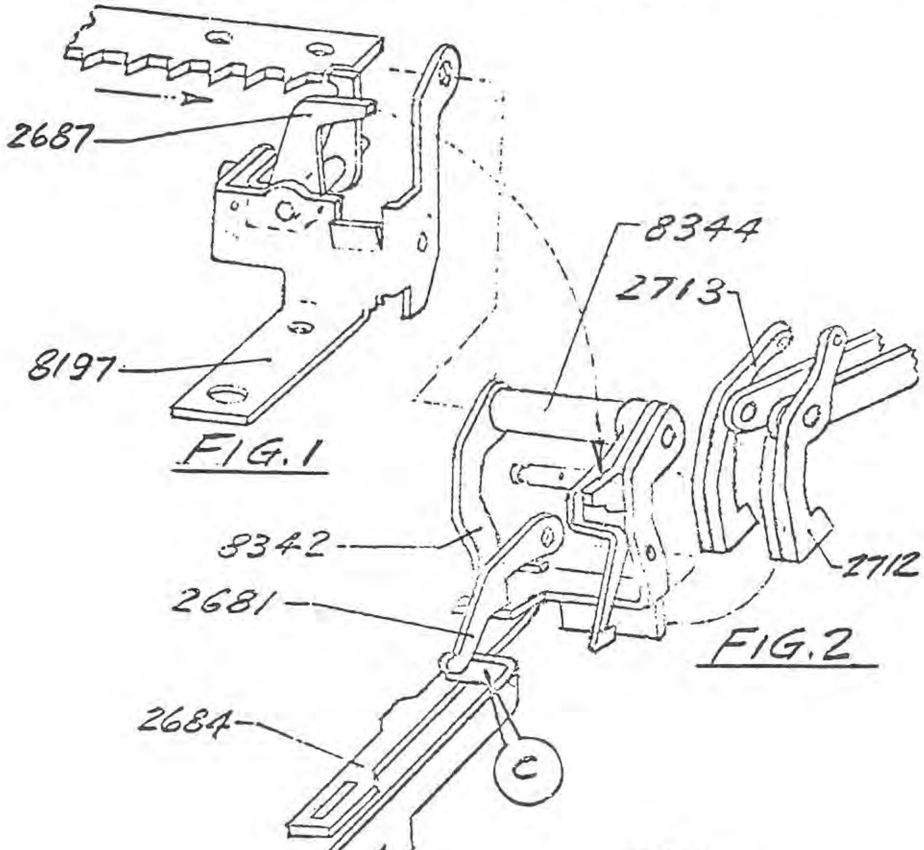


FIG. 1

FIG. 2

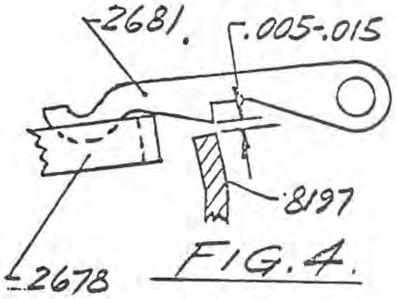


FIG. 4.

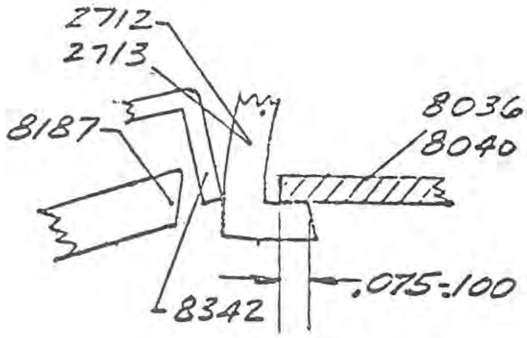


FIG. 3.

35. AUTOMATIC RECALL CONTROL

a) With the Storage Key latched down and the List Unit escaped one or more spaces, the Recall Actuator Hooks (2712) and (2713) must be free and move clear of the Forward Stroke Bar (8036) and the Return Stroke Bar (8040). (Ref. Fig. 1)

b) Latch the Storage Key down before 1st depression of Multiply Key.

After 2nd depression of the Multiply Key with no item in the keyboard, turn the Main Shaft slowly.

The Auto Recall Latch (2681) of the Auto Recall Control Assembly (8633), in the upper right hand corner of the keyboard, must drop into latch position with at least .008 overthrow and with no bind. (Fig. 2)

Adjust by forming the hook at the rear of the Auto Recall Multiply Cutoff Link (5646). (Fig. 3) (Recheck Adj. 22c.)

c) Continue the cycle and with the "U" Cam Shaft in "C" or "D" position [when latch (2681) is latched on the bracket (8627)], there should be at least .020 clearance between the hooks (2712) and (2713) and the bars (8036) and (8040). (Fig. 4)

To adjust, form the ear on the Recall Unit Control Latch Assembly (8342). (Ref. A, Fig. 4)

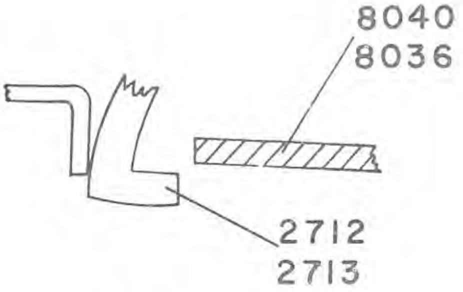


FIG. 1

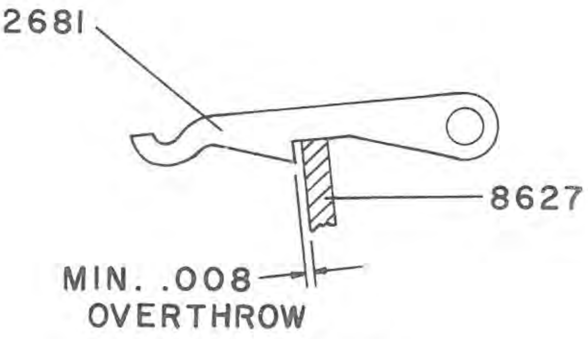


FIG. 2

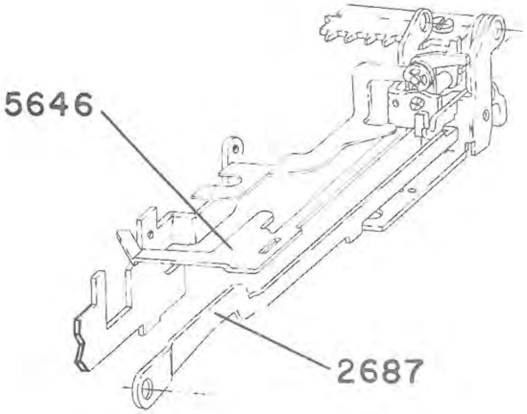


FIG. 3

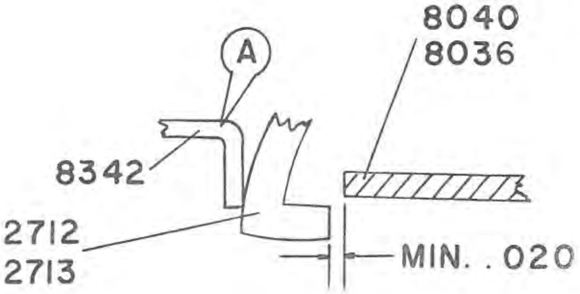


FIG. 4

35. AUTOMATIC RECALL CONTROL

d) With machine fully restored, latch the storage key down to move the Slide (8187.1) out of contact with the Recall Return Stroke Actuator Hook (2712).

The Recall Actuator Hooks (2712) and (2713) must have .075 to .100 engagement with the Return Stroke Bar (8040) and the Forward Stroke Bar (8036). (Fig. 3)

To adjust, form the arm (Ref. A, Fig. 1) of the Auto Recall Latch Actuator Yoke (8623). (Recheck Adj. 22b.)

e) With the Auto Recall Latch Release Link (2678) in restored (up) position, the Latch (2681) should be held .002 to .020 (.020 preferred) above the upper edge of the tab on the Control Bracket (8627). (Fig. 2)

Adjust by forming Auto Recall Latch Release Link (2678). (Fig. 2 and Ref. C., Fig. 1)

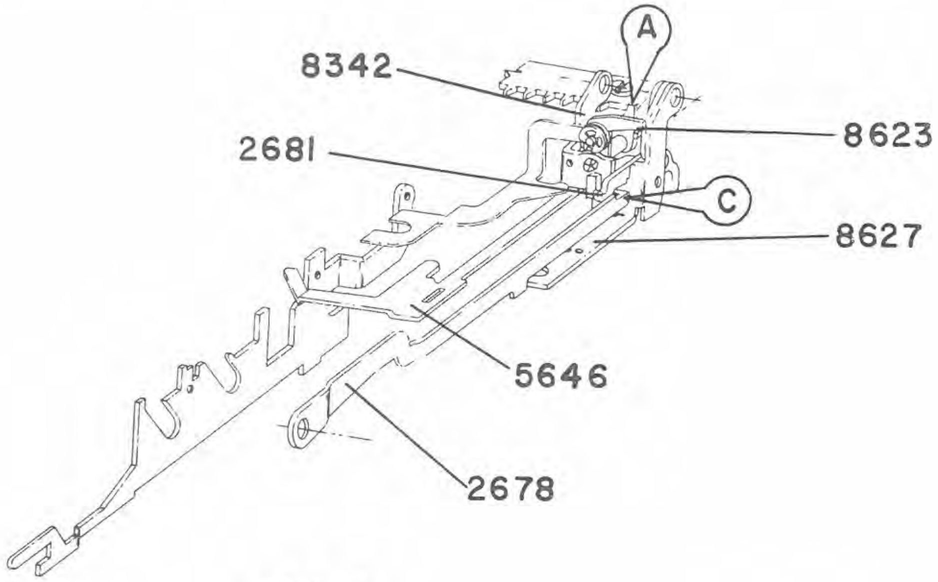


FIG. 1

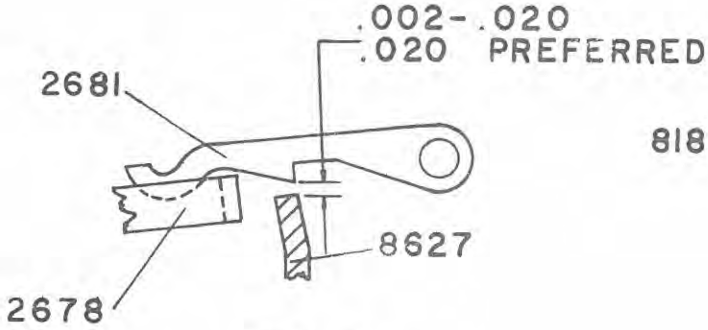


FIG. 2

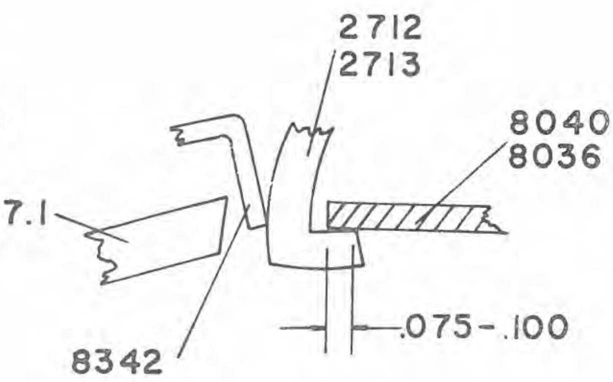


FIG. 3

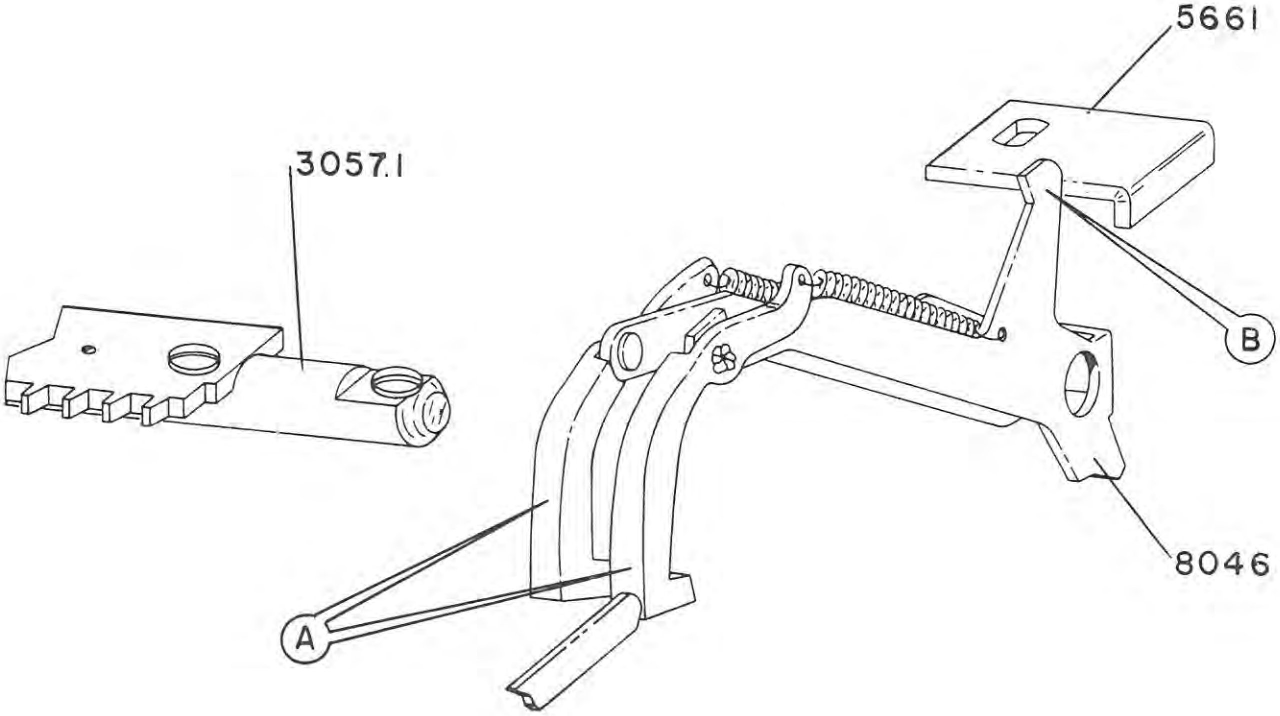
35. AUTOMATIC RECALL CONTROL

f) Latch the Storage Key down and allow the List Unit to escape. Restore the List Unit and check for clearance between the Escapement Rack Shaft (3057.1) and the Recall Hooks. (Ref. A)

In case of interference, adjust the Limit Plate (5661) to stop the Recall Hook Assembly (8046) (Ref. B) and provide .005 to .010 clearance between the Shaft and the Recall Hooks.

When making the adjustment, the formed portion must be against the side of the Top Plate to prevent shifting during machine operation.

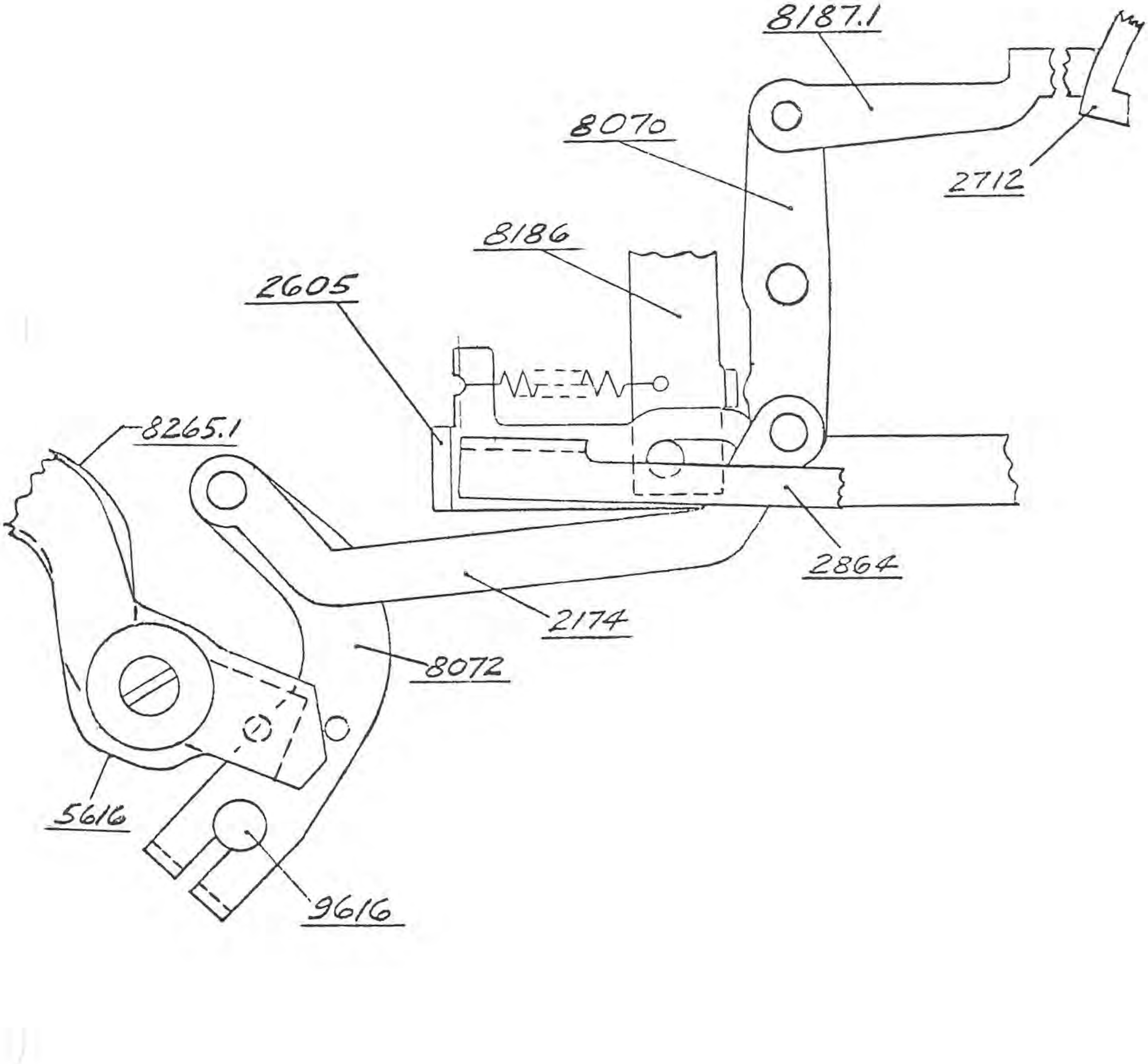
Recheck Adjustment 31b.



36. RECALL AND STORAGE CONTROL

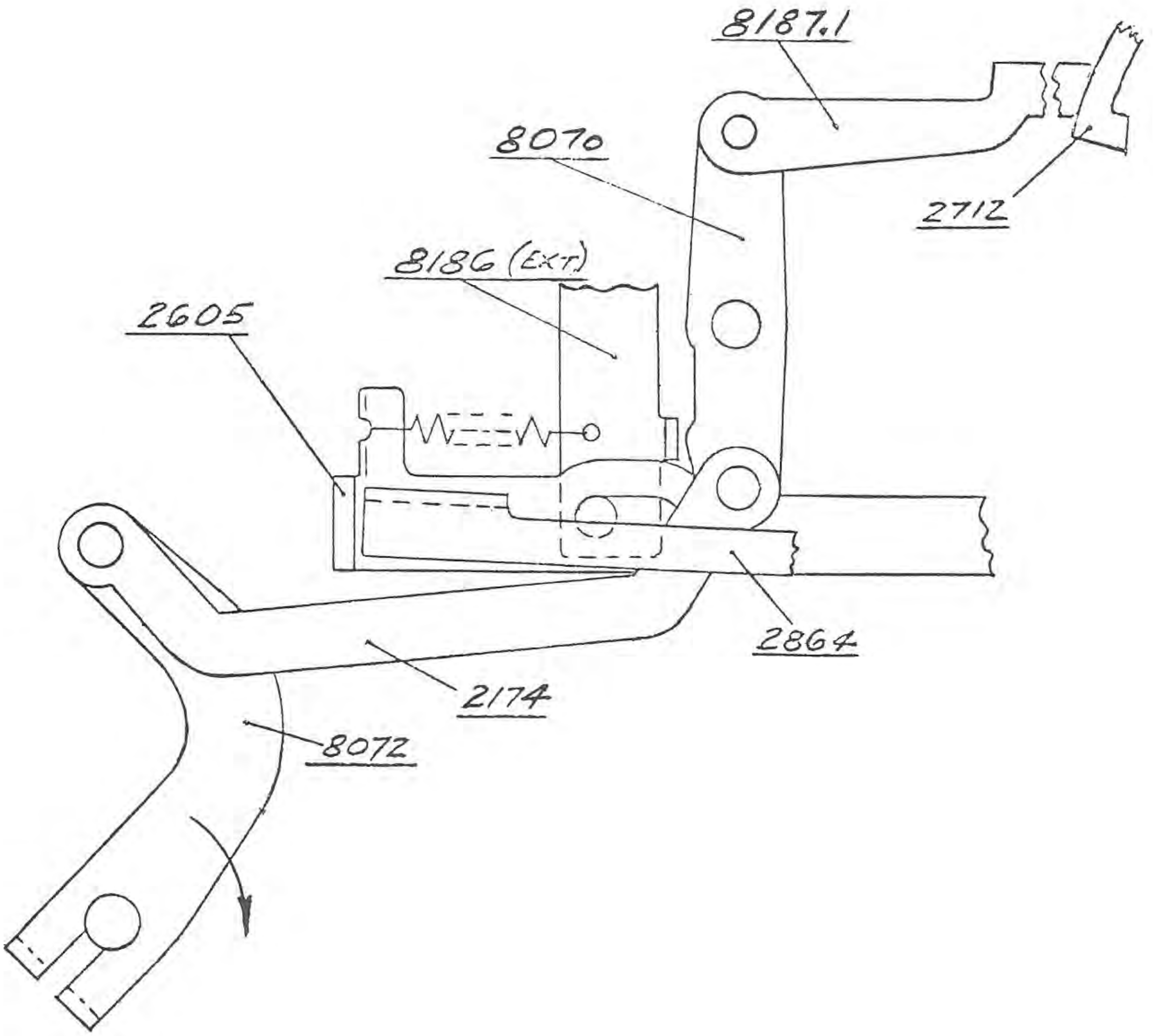
a) With machine normal, adjust the Storage Key Bellcrank (8072) on the right end of the Storage Shaft so that the Recall Unit Return Stroke Actuator Hook Control Finger (8187.1) just touches the Recall Unit Return Stroke Actuator Hook (2712) without moving it.

b) Be sure that the Storage Control Shaft Assembly (9616) has .005 - .010 end play.



36. RECALL AND STORAGE CONTROL

c) The movement of the Storage Shaft Bellcrank (8072) should be the same from the Storage Key as it is depressed and the Universal Cam Shaft as it goes to "B" position. With Storage Key latched, and as Slide (8186) is actuated by the Universal Cam Shaft turning to "B" position (first cycle after 2nd depression of Multiply Key), the lug of Slide (8186) should just contact Bellcrank (8070) without driving it. Upon release of the Storage Key, Bellcrank (8070) should not move forward. Adjust by forming the extension of the Slide (8186).



36. RECALL CONTROL (MULTIPLY)

d) With machine normal, check for .005-.015 clearance between the Non Print Control Link (2864) and the Non Print Block Slide (2605) (Ref. Fig. 1). At this time Link (2864) must have not less than a full hold on Slide (2605).

When the List Unit is in mesh with the Racks, the Slide (2605) must pass under the Link (2864) with not less than .010 clearance (Ref. Fig. 2).

Adjust by forming the Non Print Control Link (2864).

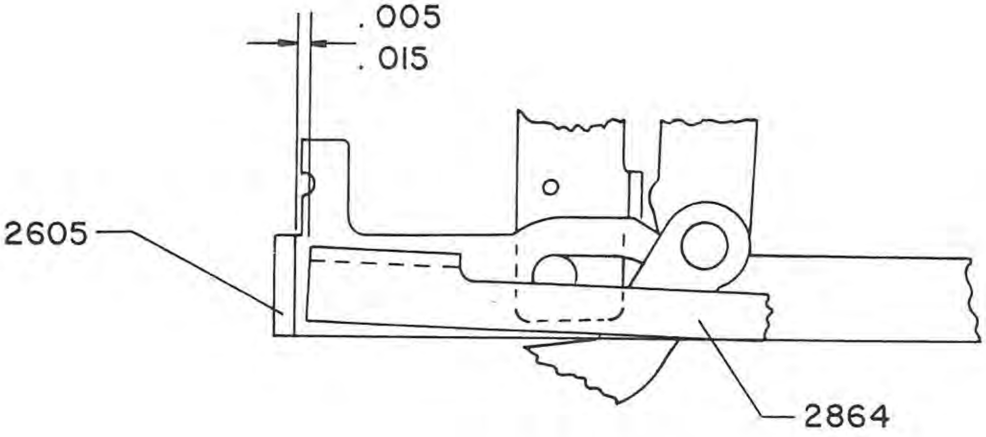


FIGURE - 1

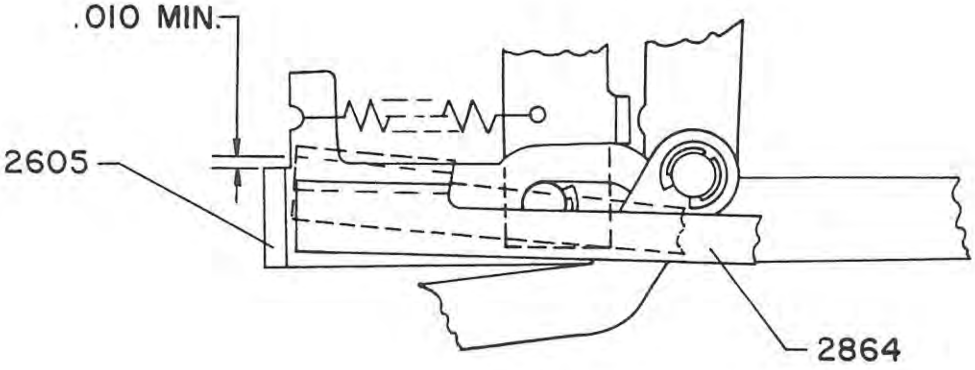
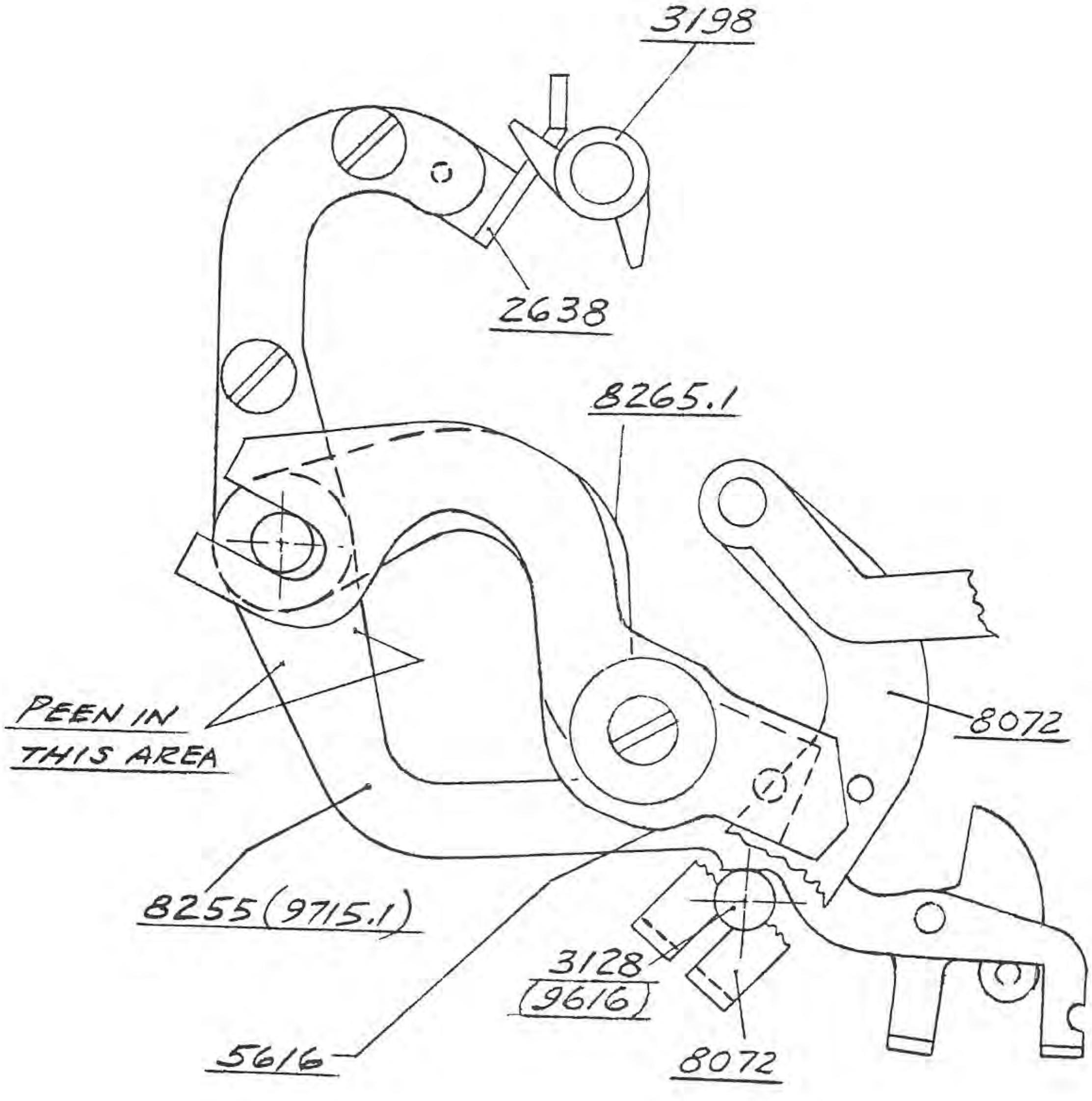


FIGURE - 2

36. RECALL CONTROL (MULTIPLY)

e) With the Universal Cam Shaft at "B" position, check to see that the Multiply Recall Control (2638) just clears the Multiply Recall Control Cam (3198) and the Multiply Recall Unit Lock Release Arm (8255) in Assembly (9715.1) rests solidly on the shaft of the Storage Control Shaft Assembly (9616). Adjust by peening the Release Arm (8255) in the area indicated.



36. RECALL CONTROL (MULTIPLY)

f) Adjust the Multiply Recall Control Finger (5616) to clear the stud in the Storage Shaft Bellcrank (8072) .005 to .015 in normal position (Ref. Fig. 1). When in raised position, its point must be above the center of the stud and the Multiply Recall Control (2638) should rest on the Yoke Shaft (8502) (Ref. Fig. 2). At this time, the Multiply Recall Control Finger (5616) must hold the Storage Shaft in the same position as when actuated by the Storage Key latched.

NOTE: Be sure that the Roll Pin in the Yoke Shaft (8502) laterally clears the Multiply Recall Control (2638) should the Shaft be turned to position the Roll Pin as shown (Ref. Fig. 2). If necessary, form the Control Arm (8245) just above the hub.

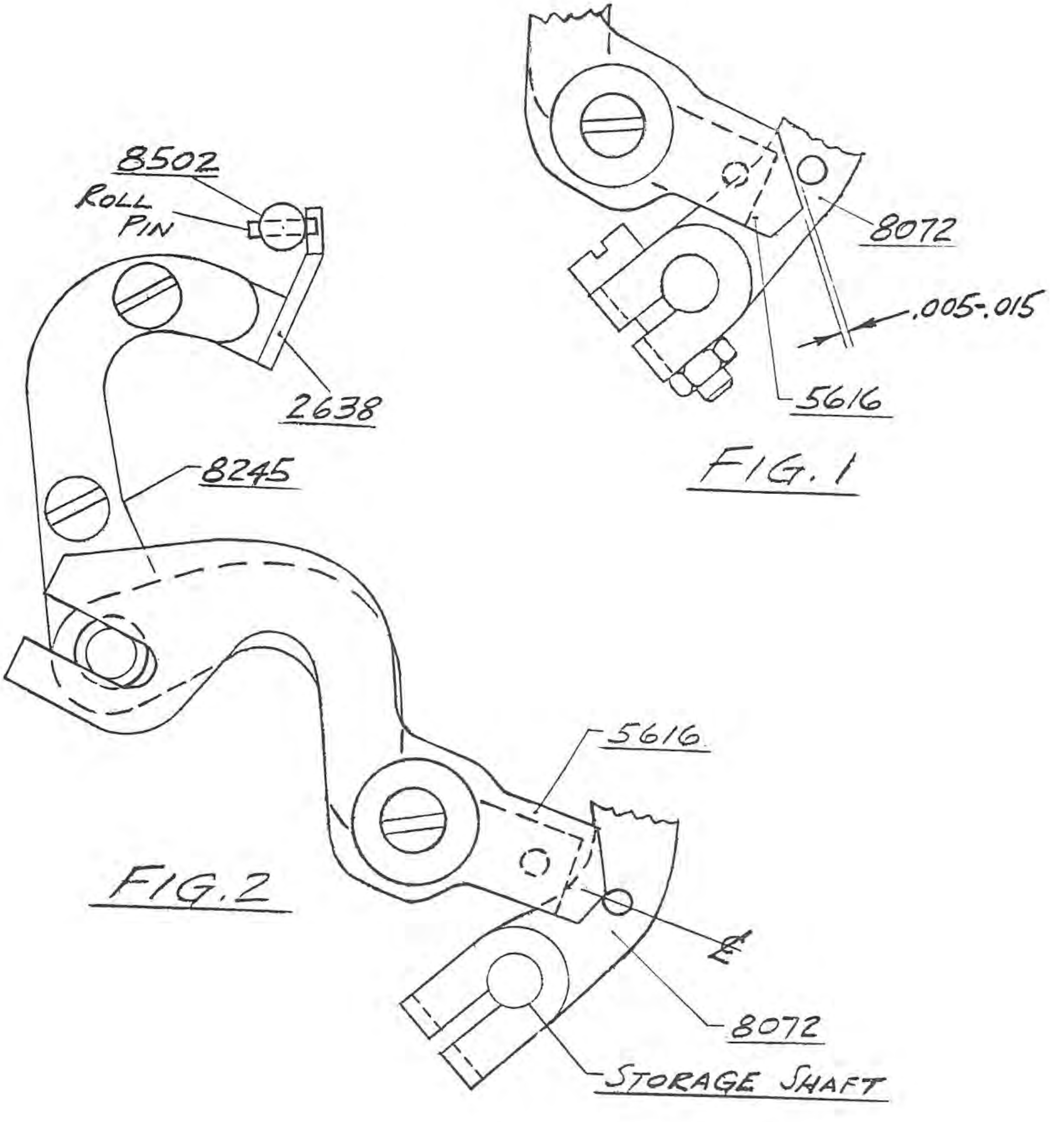


FIG. 1

FIG. 2

37. TYPE FIRING PLATE AND PLATEN FEED ARM

a) Depress the Correction Key, turn the Main Shaft until the Type Firing Plate (2158) is pulled to the right and see that it has slight further movement. (Ref. Fig. 1). Adjust by forming Non Print Bellcrank (2581), where it contacts the Type Firing Plate (2158).

b) In problem (1x1), after second depression of the Multiply Key, turn the Main Shaft and when the Return Stroke Bar is fully down, check for same condition as in (a). To adjust, form the right end of the Non Print Bellcrank (2581) (Ref. Fig. 1).

c) Continue to turn the Main Shaft and as the Return Stroke Bar returns and the Non Print Actuator Assembly (8043) rests on the Non Print Block Slide (2605) (Ref. Fig. 3) check for at least .010 clearance between the Platen Feed Arm (8315) and the Carriage Feed Bellcrank (8297) (Ref. Fig. 2). Adjust by forming the Platen Feed Arm (8315).

d) Turn the Main Shaft further after the Return Stroke Bar is down again and check for at least .010 clearance between the side of the roll on the List Unit Reset Bellcrank (8080) and the List Unit Restore Cam (2217). Adjust through the eccentric on the List Unit Reset Mechanism-Non Print Control (8463).

e) Continue to cycle and when the Type Firing Plate (2158) restores, check to see that the Platen Feed Arm (8315) has a full hold on the Carriage Feed Bellcrank (8297).

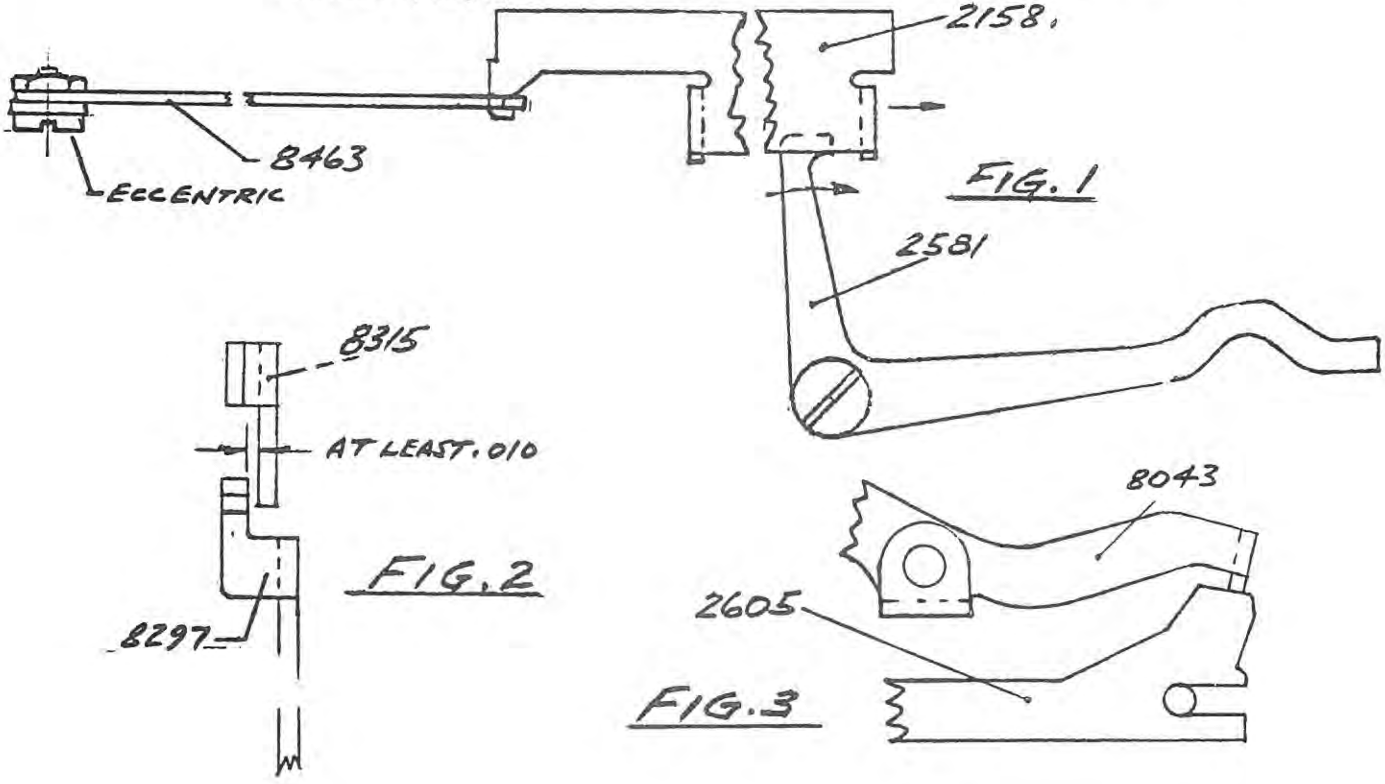


FIG. 1

FIG. 2

FIG. 3

37. TYPE FIRING PLATE AND PLATEN FEED ARM

a. Depress the correction key, turn the main shaft until the Type Firing Plate (2158) is pulled to the right and see that it has slight further movement. (Ref. Fig. 1). Adjust by forming Non-Print Bellcrank (2581), where it contacts the Type Firing Plate (2158)

b. In problem (1 x 1), after second depression of the multiply key, turn the main shaft and when the return stroke bar is fully down, check for same condition as in (a). To adjust, form the right end of the Non-Print Bellcrank (2581) (Ref. Fig. 1).

c. Continue to turn the main shaft and as the return stroke bar returns and the Non-Print Actuator Assembly (8043) rests on the Non-Print Block Slide (2605) (Ref. Fig. 3) check for at least .015 clearance between the Platen Feed Arm (8315) and the Carrige Feed Bellcrank (8297) (Ref. Fig. 2). Adjust by forming the Platen Feed Arm (8315).

d. Turn the main shaft further after the return stroke bar is down again and check for at least .015 clearance between the side of the roll on the List Unit Reset Bellcrank (8080) and the List Unit Restore Cam (2217). Adjust through the eccentric on the List Unit Reset Mechanism Non-Print Control (179970).

e. Continue to cycle and when the Type Firing Plate (2158) restores, check to see that the Platen Feed Arm (8315) has a full hold on the Carriage Feed Bellcrank (8297).

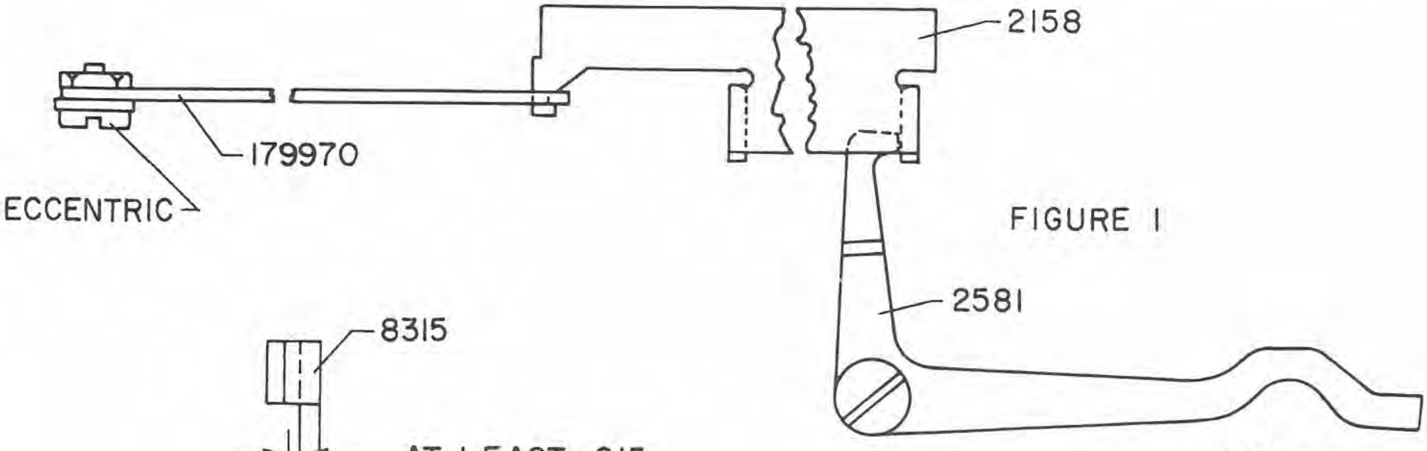


FIGURE 1

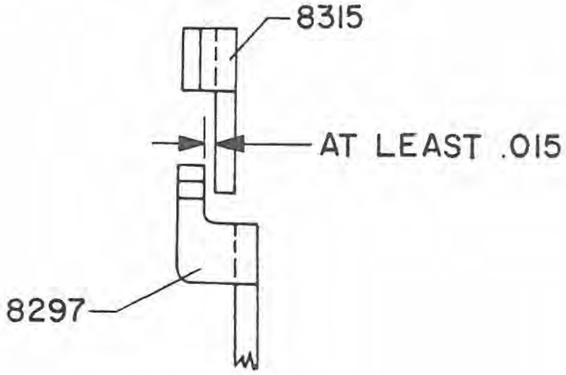


FIGURE 2

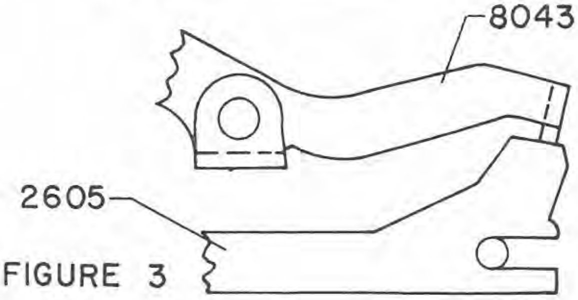


FIGURE 3

38. M & Q BRIDGE

a) Check the M & Q Control Slide Finger (2675) to align laterally with the M & Q Bridge (2281). (Ref. A, Fig. 2). Depress the Multiply Key and note that the Finger (2675) passes below the M & Q Bridge (2281). At second Multiply Key depression, see that the M & Q Control Slide Finger (2675) contacts the M & Q Bridge (2281) squarely. Form rear end of M & Q Bridge Control Slide (2210) if necessary (Ref. Fig. 1).

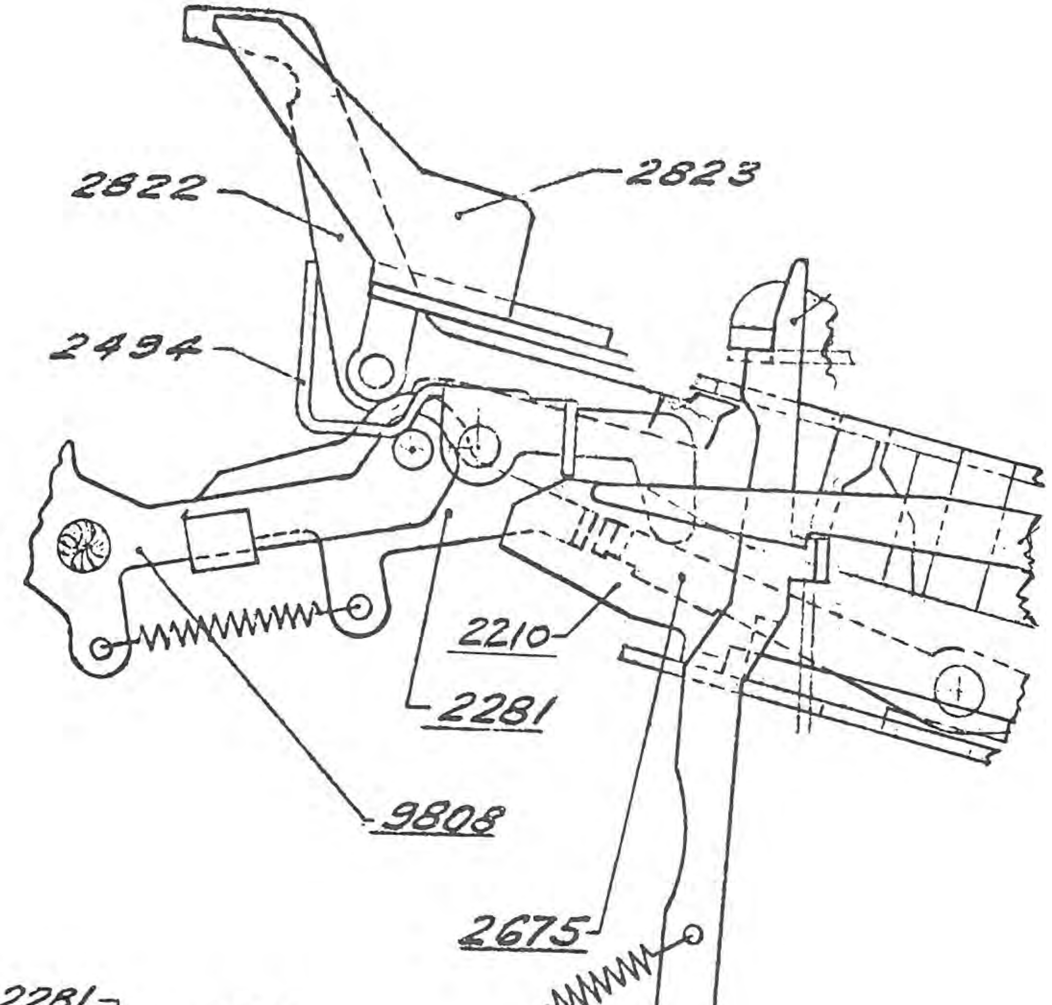


FIG. 1

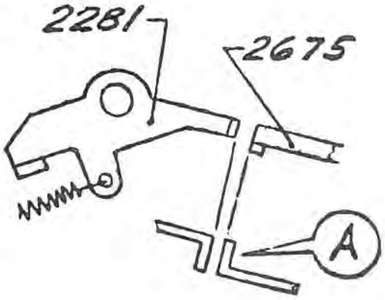


FIG. 2

38. M & Q BRIDGE

a) Check the M & Q Control Slide Finger (2675) to align laterally with the M & Q Bridge (2281). (Ref. A, Fig. 1)

Depress the Multiply Key.

The Finger (2675) must pass below the M & Q Bridge (2281). (Fig. 1)

At second Multiply Key depression, the M & Q Control Slide Finger (2675) must contact the M & Q Bridge (2281) squarely. (Fig. 2)

To adjust, form rear end of M & Q Bridge Control Slide (2210) (Fig. 2) for both the first and second depression of the Multiply Key.

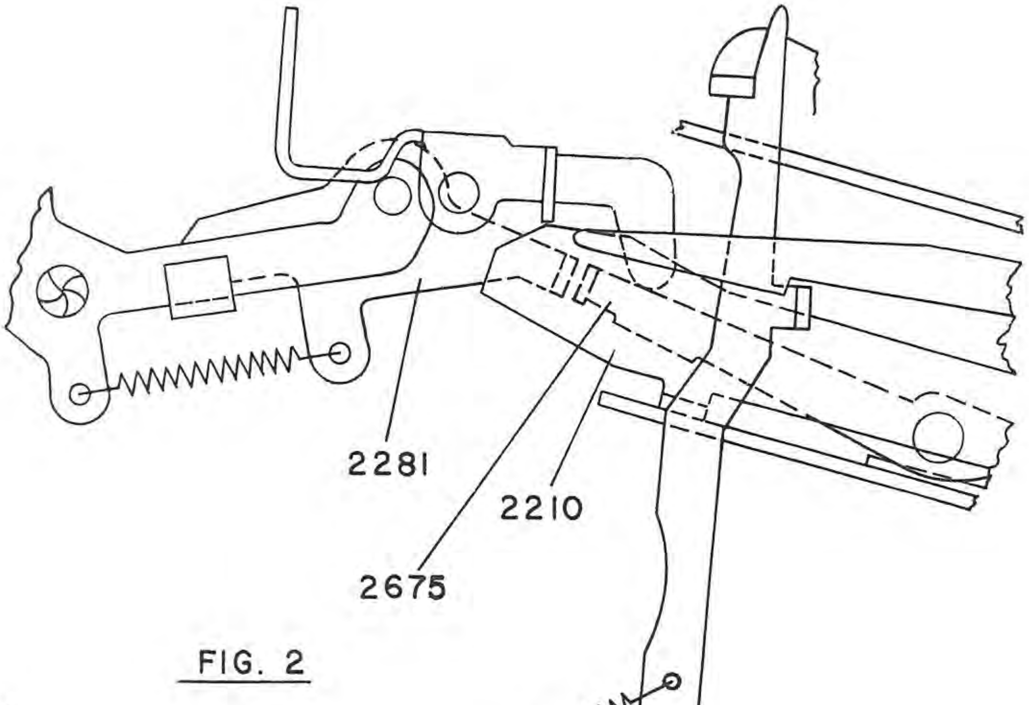


FIG. 2

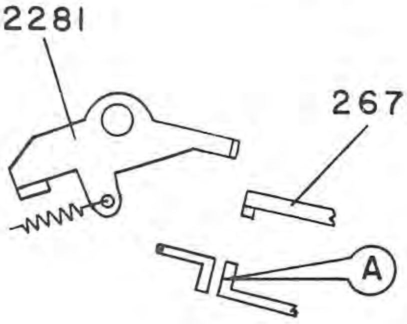
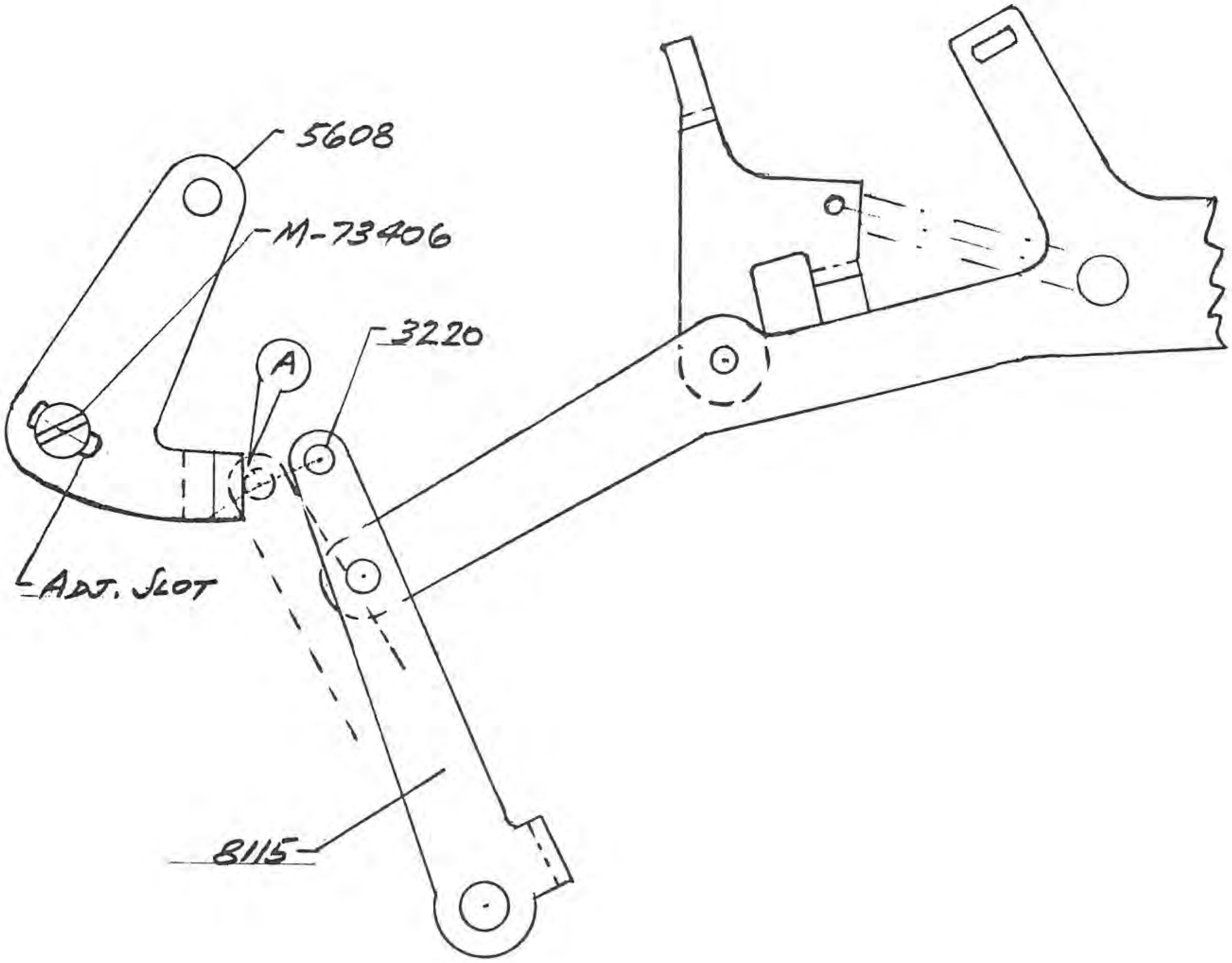


FIG. 1

38. M & Q BRIDGE - OVERTHROW STOP

b) With the Multiply Key held fully down after the 2nd depression, to hold the M & Q Mechanism to the rear, position the Overthrow Stop (5608) (at the Left Side Frame) against the Stud (3220) in the M & D Drive Arm (8115) (Ref. A) and lock in place with the Screw (M-73406).



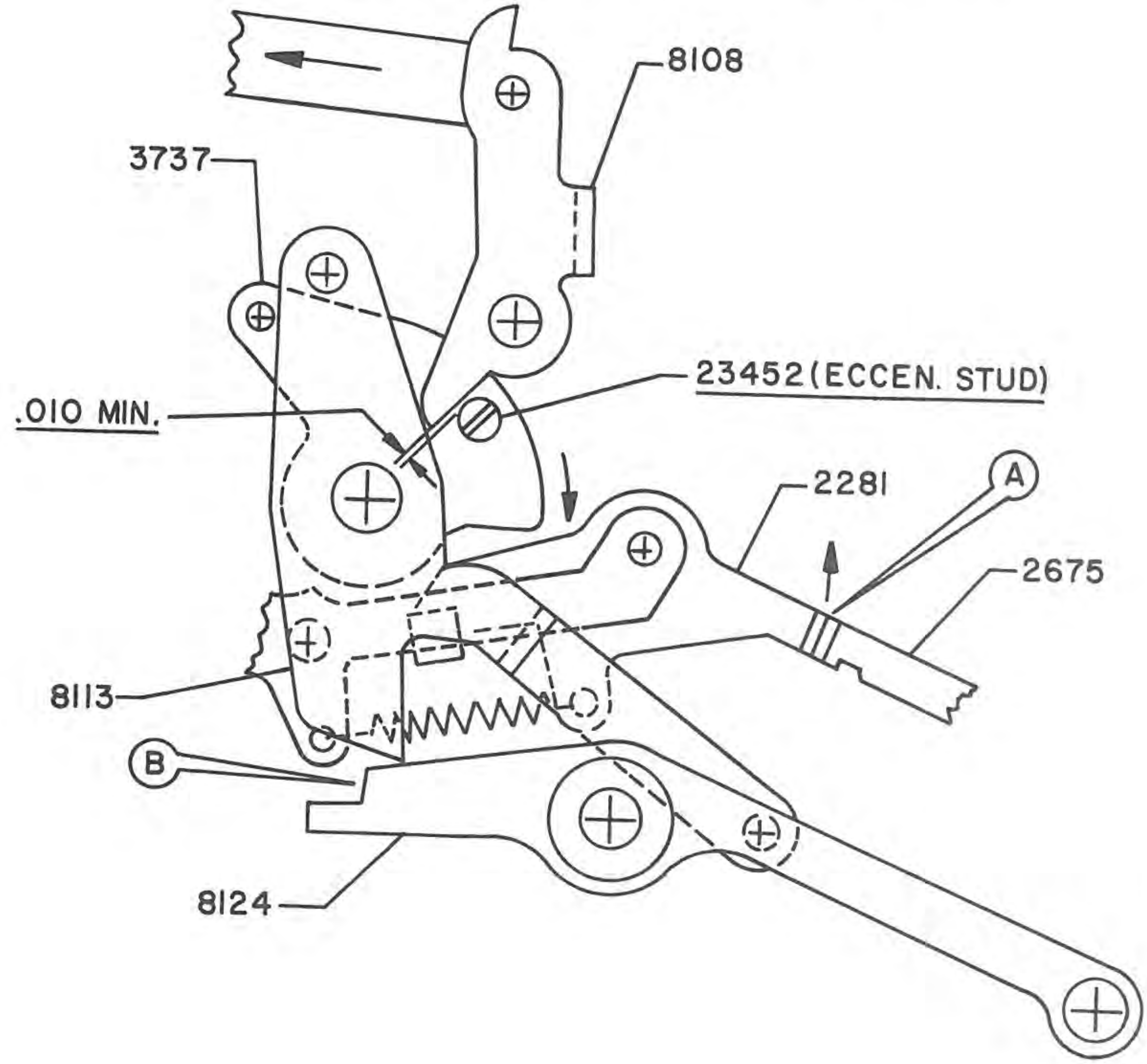
38. M & Q Bridge (Division)

c) In a division problem, (at the beginning of the remainder readout cycle), as the Backspace Actuator Yoke (8108) rocks the M & Q Release Arm (3737) through contact with the Eccentric Stud (23452), the M & Q Bridge (2281) must be pivoted enough to release from the lug on the M & Q Slide Finger (2675) at A.

d) At the same time, the Universal Cam Shaft Aux. Feed Control (8113) must latch at B.

Check manually and adjust by turning the Eccentric Stud (23452).

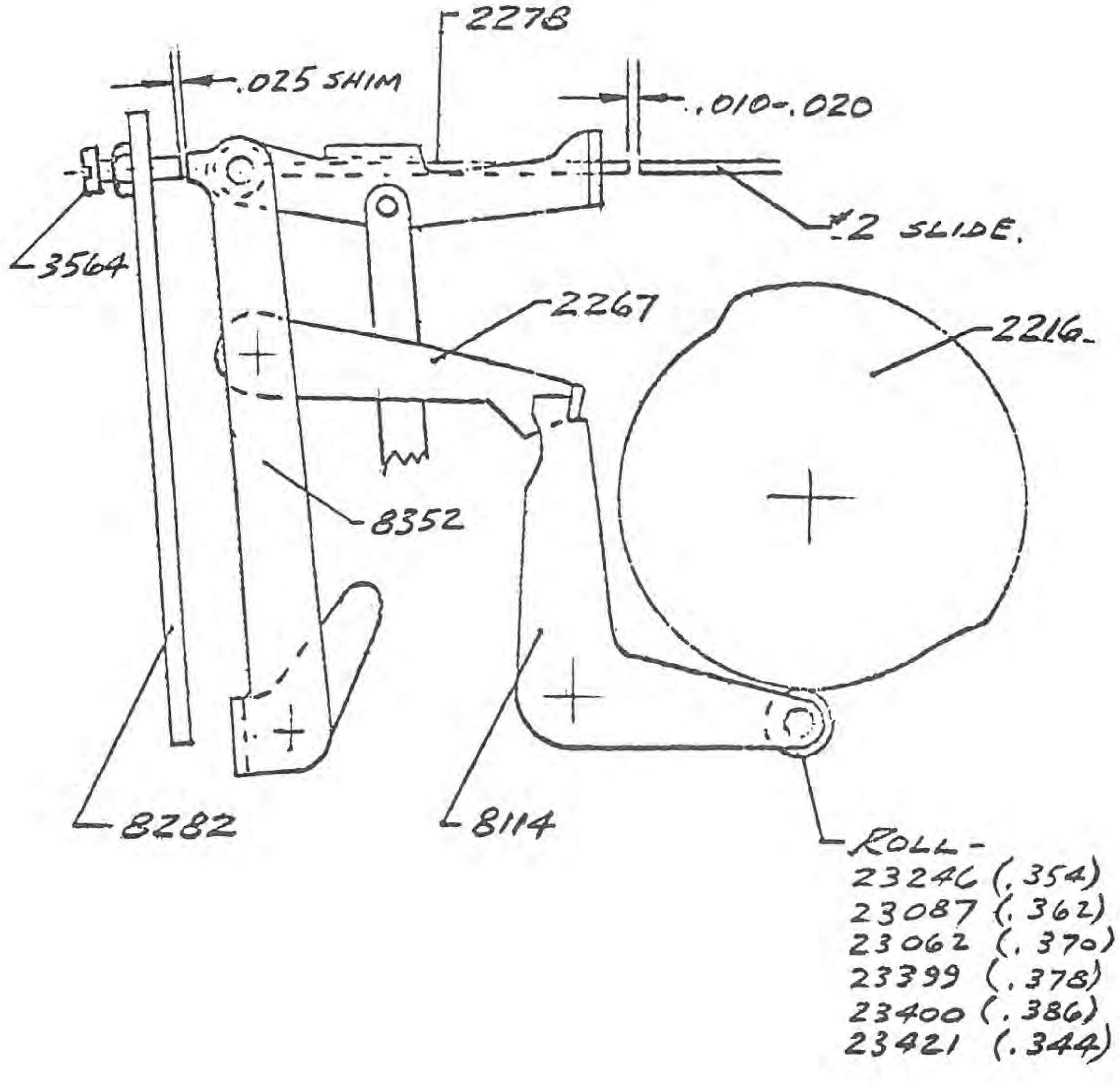
NOTE: Allow at least .010 clearance between the actuating arm on the Yoke (8108) and the Eccentric Stud (23452) on the Release Arm (3737) when the mechanism is restored.



39. M & D DRIVE (PLUNGER)

a) After 2nd depression of the Multiply Key, push the M & D Operating Arm (2278) manually to the front to latch the Link (2267) on the M & D Mechanism Drive Arm (8114). The Operating Arm (2278) must clear the #2 Slide by .010 to .020. To adjust, change the roll on the Drive Arm (8114).

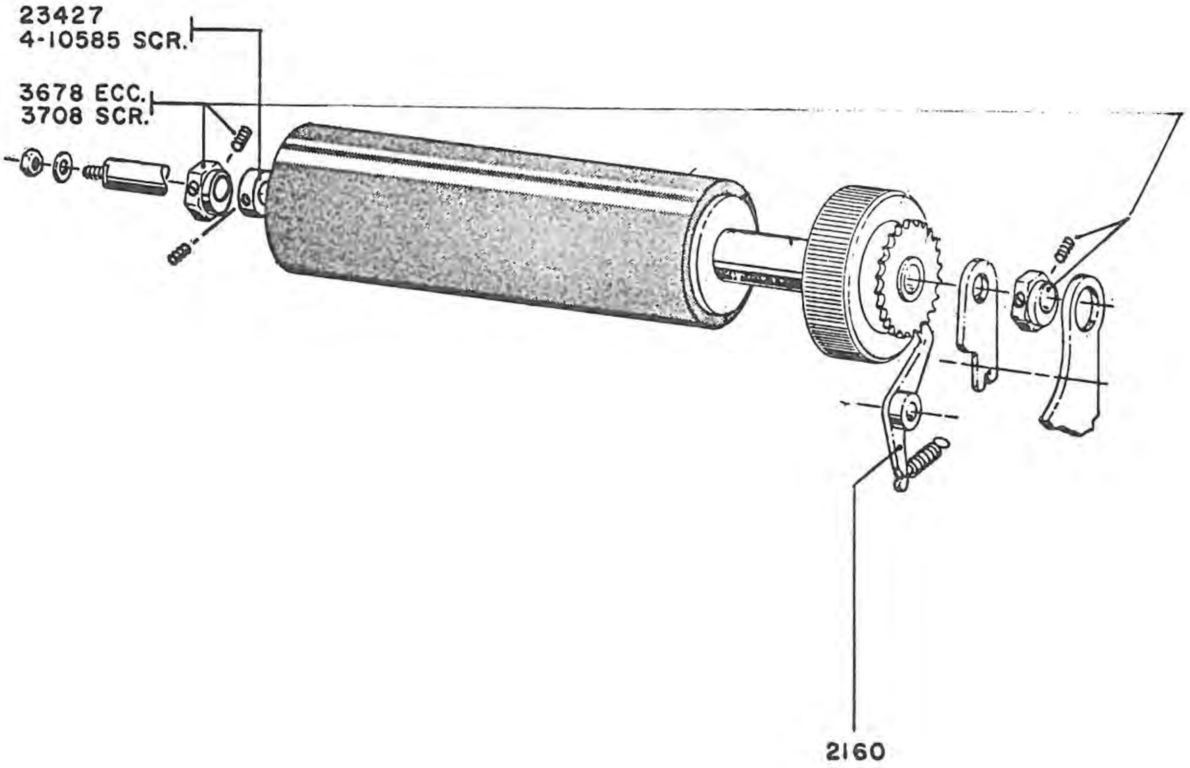
b) In unlatched position (after 2nd depression of the Multiply Key), place .025 Shim between Screw (3564) in Back Plate (8282) and M & D Operating Arm (8352). Turn the Screw (3564) until the Drive Link (2267) just fully latches on the M & D Mechanism Drive Arm (8114). Lock Screw (3564), remove .025 Shim. With a .020 Shim between Screw (3564) and Arm (8352), Link (2267) must not latch.



40. PLATEN HEIGHT AND END PLAY

a) Check for .005 - .010 end play in the Platen Shaft. Adjust by means of the Set Collar (23427).

b) Check the Platen Height by printing a full capacity of 6's and 9's. Adjust through the Platen Height Eccentric Bushings (3678) (2) on the Platen Shaft.



41. PLATEN FEED

a) Check the Platen Feed Arm (8315) to feed the Platen a full space to detented position. To adjust change the roll on the Carriage Feed Bellcrank (8297). (Ref. Fig. 1).

b) Check the Pressure Release Shaft Assembly (9627) and the Paper Cradle Assembly (9626) to be free (Ref. Fig. 2). This check can be done best with the springs removed.

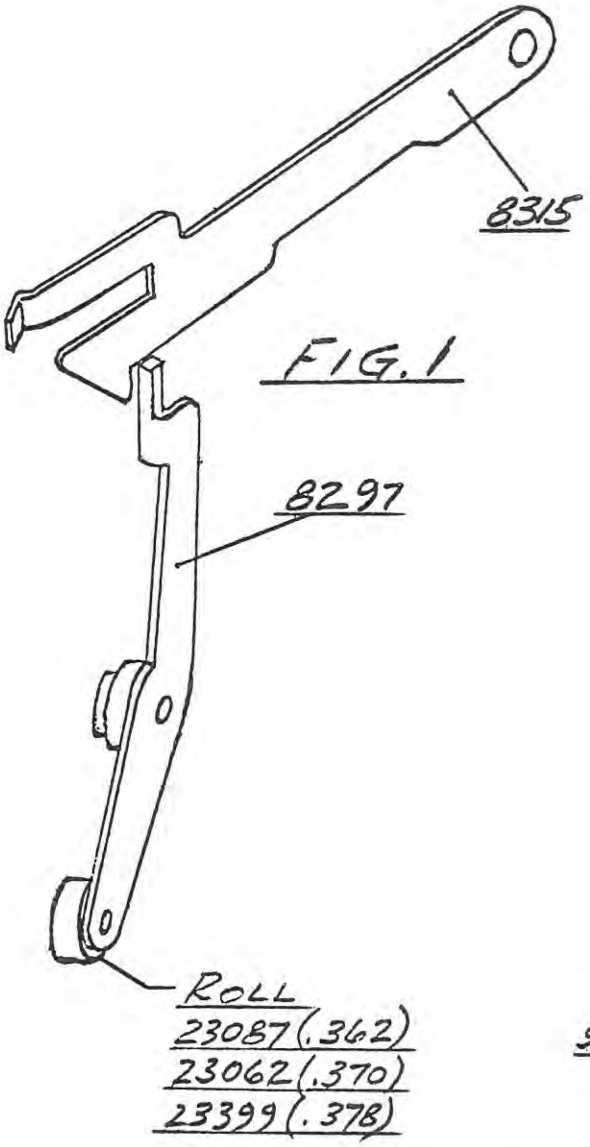


FIG. 1

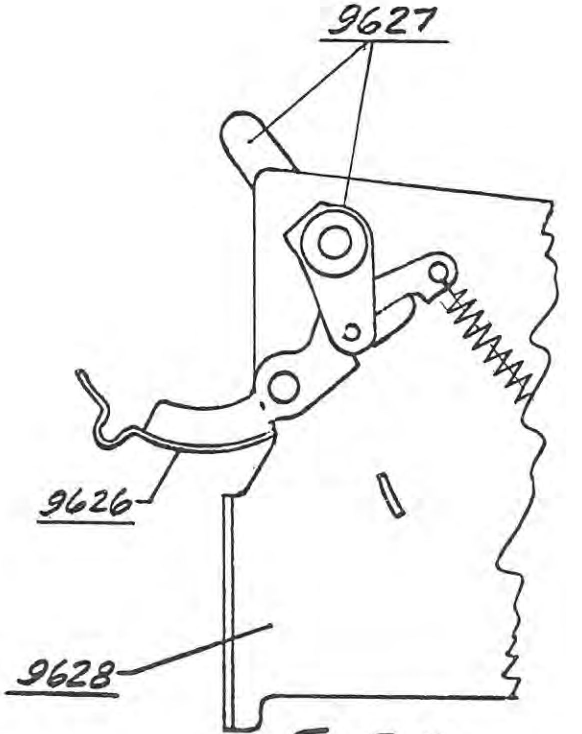
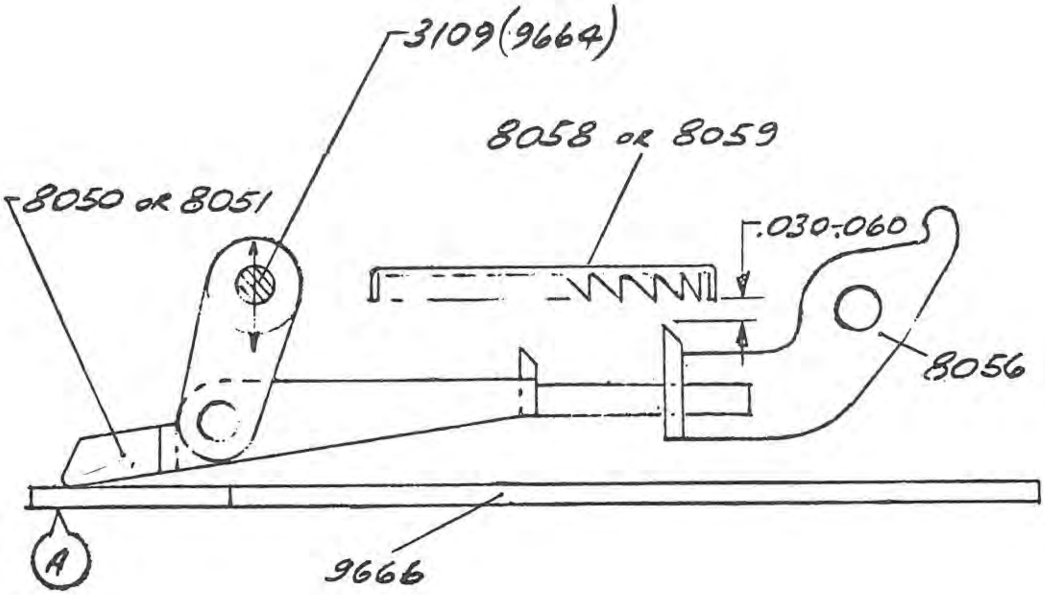


FIG. 2

42. RIBBON REVERSE SHAFT DETENT

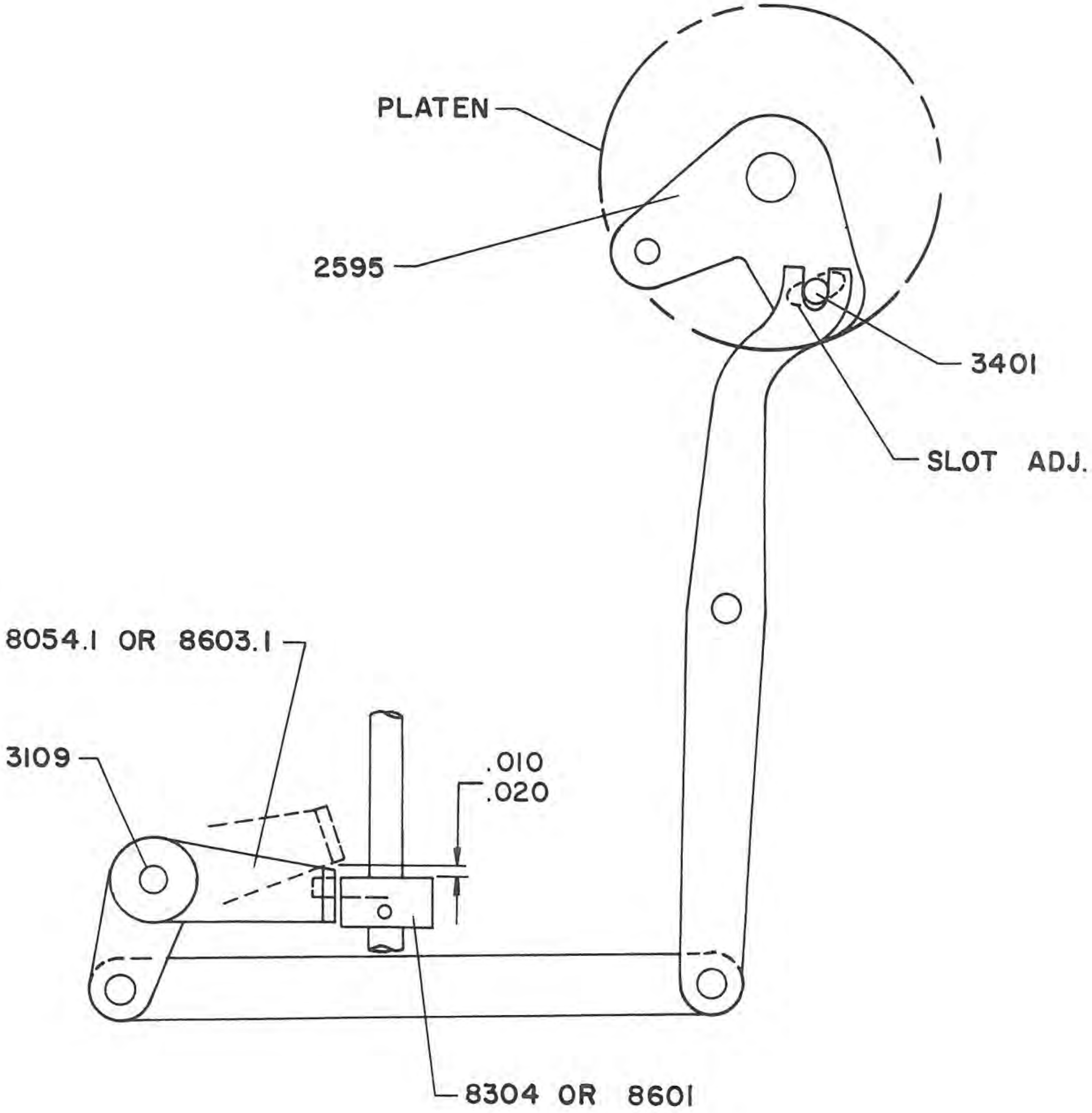
With the Ribbon Reverse Shaft (3109) in the Ribbon Reverse Shaft Assembly (9664) detented in either position, the non feeding Ribbon Feed Pawl (8050 or 8051) should hold the Ribbon Spool Retaining Pawl (8056) .030 - .060 clear of the Ribbon Spool Ratchet Gear (8058 or 8059). Adjust by forming the extensions (Ref. A) of the Rear Bottom Plate (9666).



43. RIBBON REVERSE LIFT LIMITS

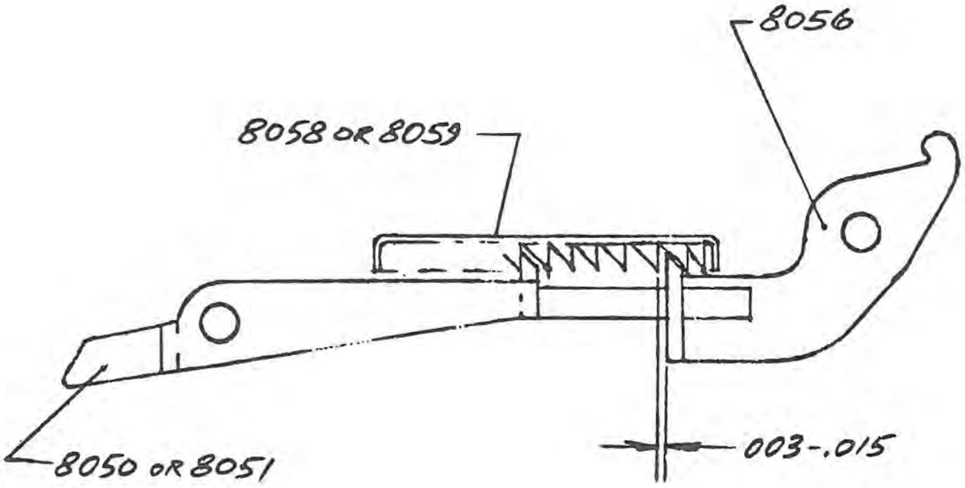
The Ribbon Feed Bellcrank (2595) should turn the Ribbon Reverse Shaft (3109) far enough so that the Ribbon Reverse Shaft Lift Cams (8054.1) Right or (8603.1) Left clear the Ribbon Reverse Lift Limits (8304) Right or (8601) Left by .010-.020.

Adjust by shifting the Platen Feed Pawl Stud (3401) in the slot on the Ribbon Feed Bellcrank (2595).



44. RIBBON FEED

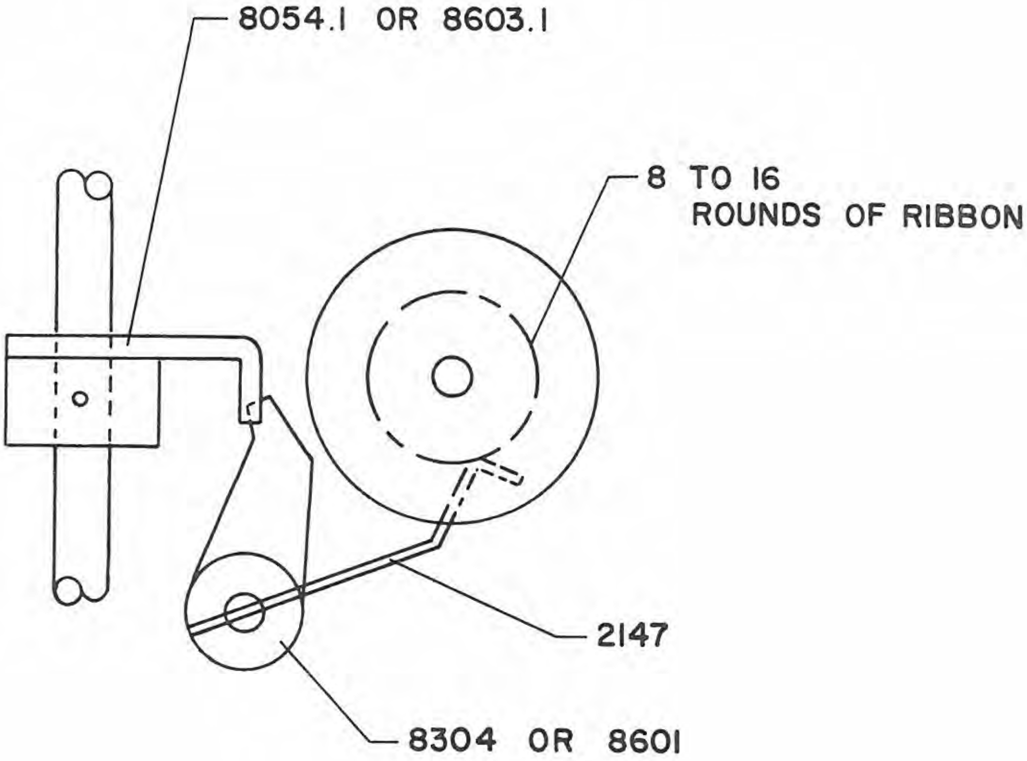
Check The Ribbon Feed Pawls (8050, Left) or(8051, Right) to advance the Ribbon Spool Ratchet Gears (8059, Left) or 8058, Right) one tooth with .003 - .015 overtravel beyond the Retaining Pawl (8056). Adjust by forming the Retaining Pawl (8056).



45. RIBBON REVERSE

The lower lip of the Ribbon Reverse Lift Limits (8601) Left or (8304) Right on the Ribbon Reverse Control Shafts must go under the Ribbon Reverse Shaft Limit Cams (8603.1) Left or (8054.1) Right to reverse the motion when there are 8 to 16 rounds of ribbon left on the spool.

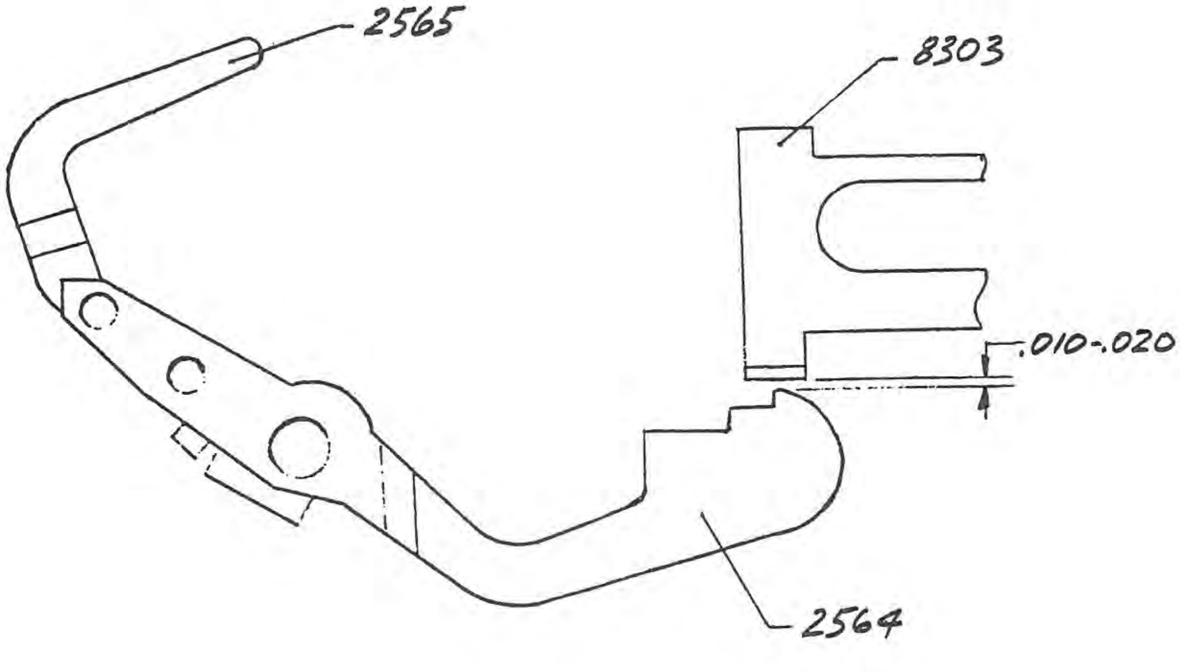
Adjust by forming the Control Fingers (2147).



46. CHARACTER FAN

a) The Character Fan Finger (2565) must align with the Universal Cam to Control Division Character (3200) when the Universal Cam Shaft is shifted to the right for Multiplication or to the left for Division. To adjust, form the upper part of the Finger (2565).

b) Depress the Add Key, turn the Main Shaft and check the Character Fan (2564) to clear under the rack lug by .010 - .020. The Character Fan (2564) may be adjusted by repositioning the Character Fan Finger (2565) and tightening screws. This adjustment is made to assure printing of Multiplication and Division symbols.



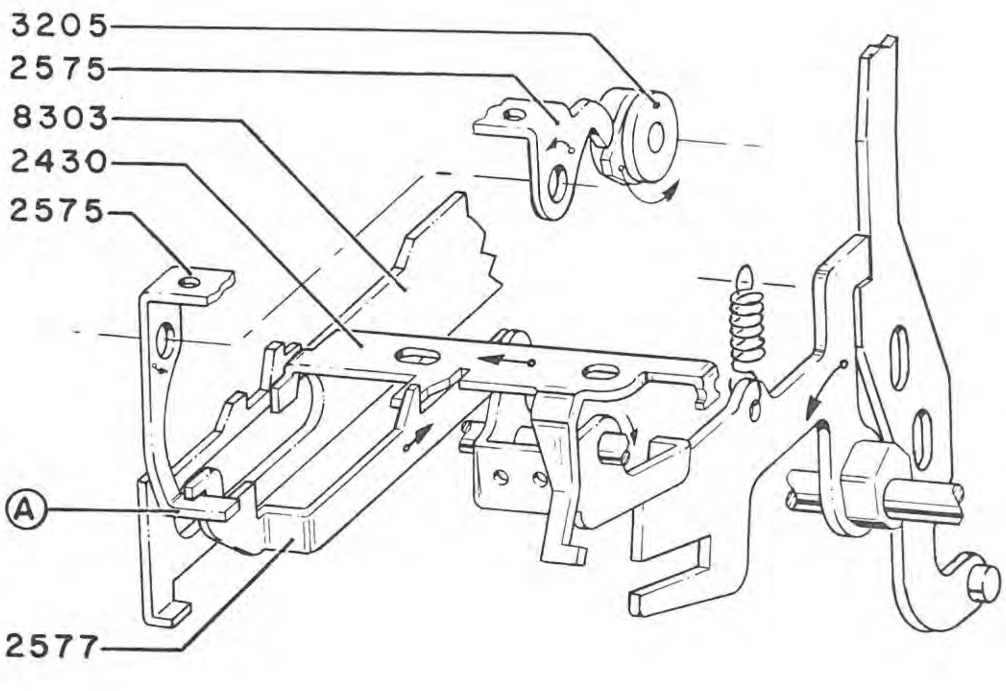
46. CHARACTER PRINTING

c) WITH THE MULT. SUBTOTAL KEY LATCHED DOWN IN A DIVISION PROBLEM, THE SUBTOTAL CHARACTER "S" SHOULD PRINT WITH THE QUOTIENT.

FAILURE TO DO SO MAY BE CAUSED BY INSUFFICIENT LATERAL MOVEMENT OF THE SUBTOTAL CHARACTER SLIDE (2430) WHICH WILL ALLOW THE CHARACTER RACK (8303) TO BYPASS TO A POSITION RESULTING IN THE PRINTING OF THE TOTAL CHARACTER "T".

ADJUST BY FORMING THE DIVISION TRANSFER YOKE FOR SUBTOTAL (2575) (REF. A).

IF THE YOKE (2575) IS FORMED, BE SURE THAT IT DOES NOT BIND THE UNIVERSAL CAM SHAFT WHEN ACTUATED BY THE CAM (3205).



47. UNIVERSAL CAM SHAFT DRIVE

Check the Universal Cam Shaft Feed Segment (8130) for .003 to .006 backlash in the Universal Cam Shaft Drive Ratchet Gear (3194) (Ref. Fig. 2). Adjust through the Eccentric Screw in the Left Side Frame (Ref. A, Fig. 1). Check in all positions of the Universal Cam Shaft.

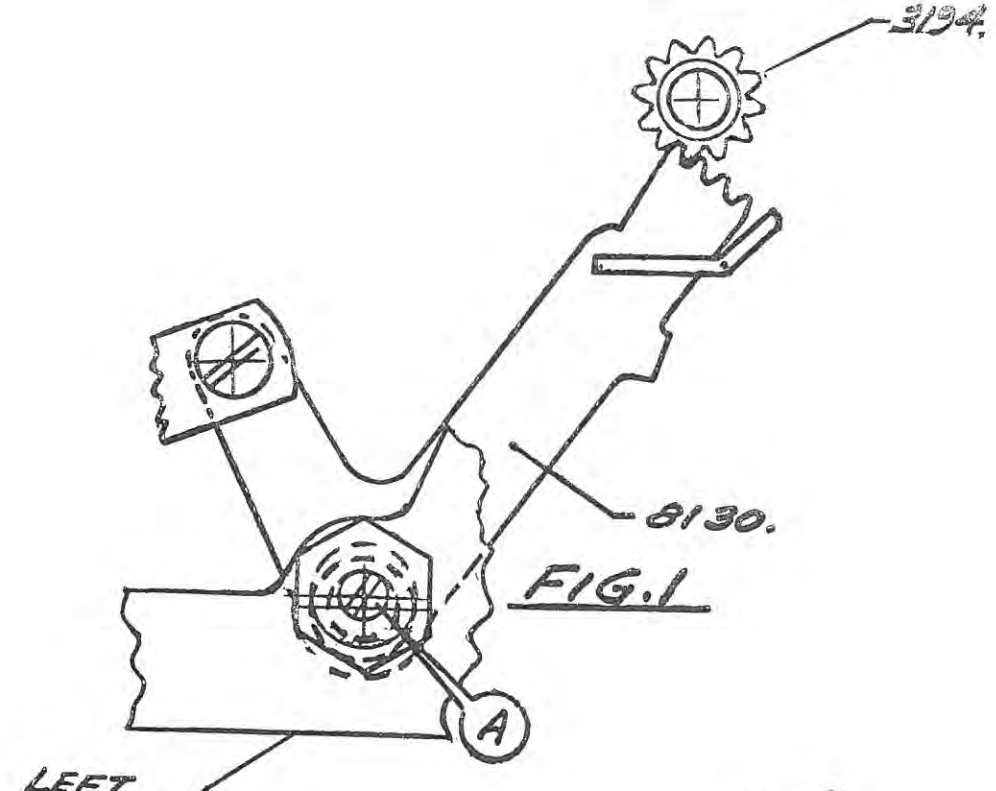


FIG.1

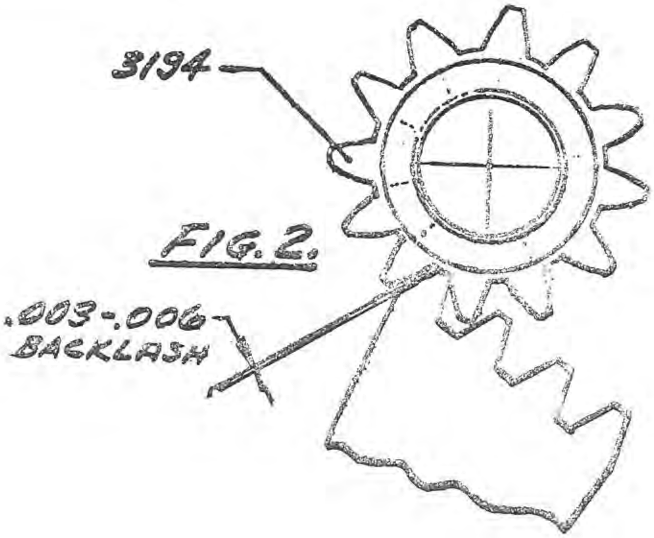
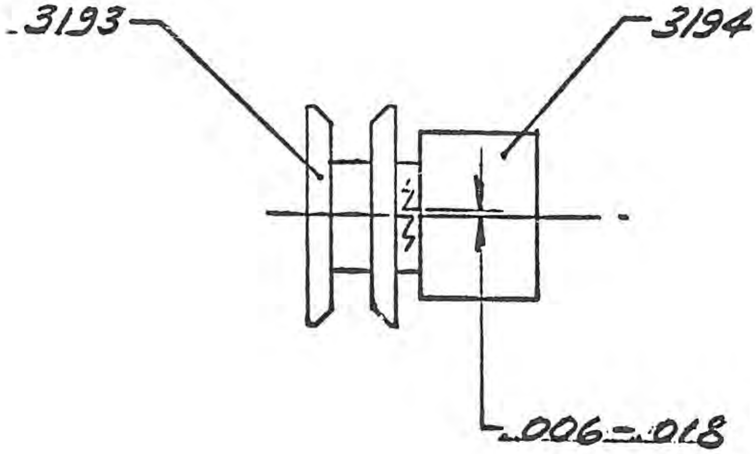


FIG.2.

48. UNIVERSAL CAM SHAFT DRIVE

When the Universal Cam Shaft is detented in any of the following positions - A, B, C or D, there must be .006 - .018 clearance between the teeth on the Universal Cam Shaft Drive Ratchet Gear (3194) and the teeth on the Universal Cam Shaft Shift Gear (3193).

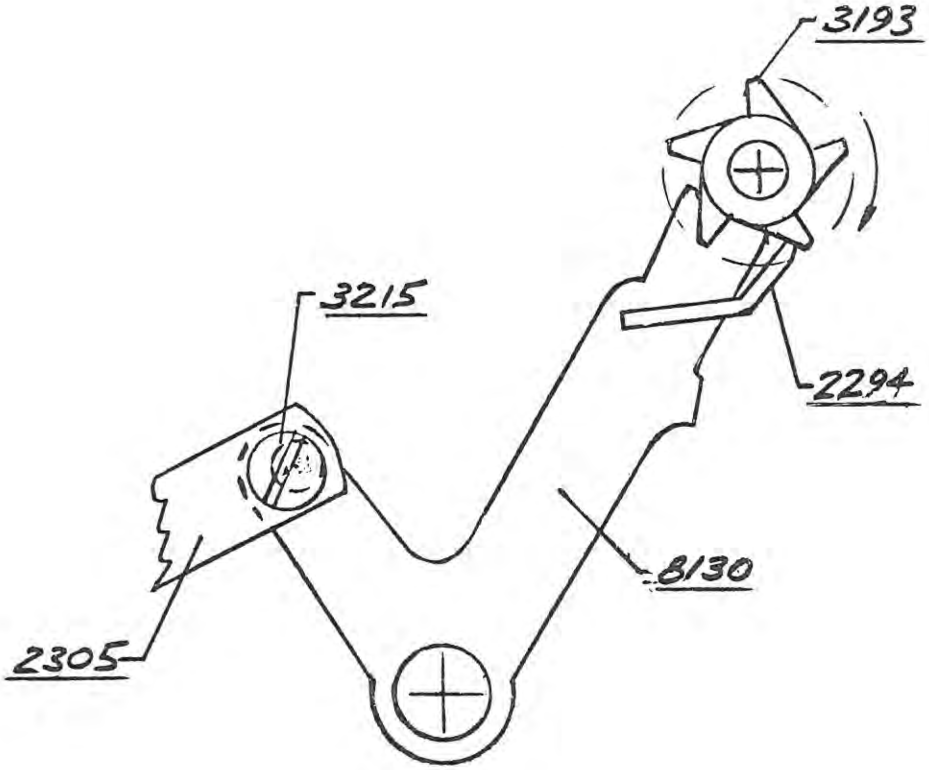
To adjust for the above clearance, slide the Ratchet Gear (3194) to the right and rotate it to the proper position.



49. UNIVERSAL CAM SHAFT DRIVE

Depress the Multiply Key, turn the Main Shaft slowly until the Universal Cam Shaft Feed Segment (8130) is fully actuated to rotate the Universal Cam Shaft to "A" position. Check to see that the "U" Cam Shaft Feed Segment (8130) limits in the "U" Cam Shaft Shift Gear (Star Wheel) (3193) without binding. Adjust through Eccentric Screw (3215) on the Universal Cam Shaft Segment (8130). (Check in all positions of the Universal Cam Shaft.)

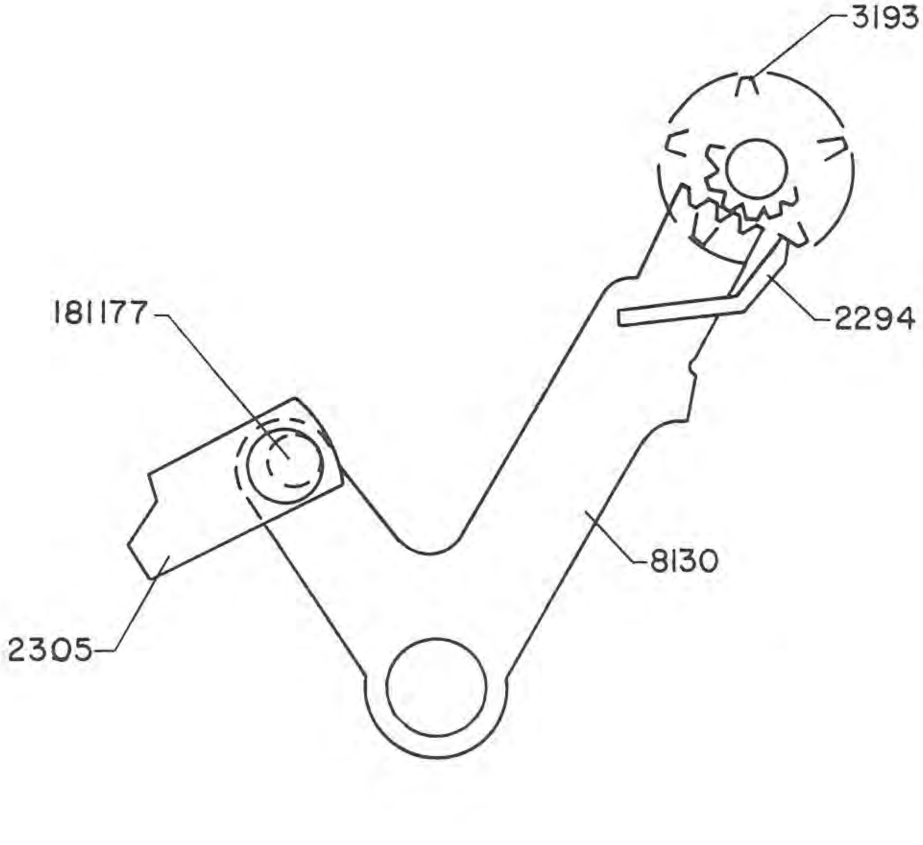
NOTE: For "A" and "B" positions, hold the Detent Yoke (8448) (Ref. Adj. 50a, b) out until the Segment (8130) is fully actuated, then release the detent, and make required check. "C", "D" and "E" positions can be checked with the normal detent action.



49. UNIVERSAL CAM SHAFT DRIVE

Depress the multiply key, turn the main shaft slowly until the Universal Cam Shaft Feed Segment (8130) is fully actuated to rotate the universal cam shaft to "A" position. Check to see that the "U" Cam Shaft Feed Segment (8130) limits in the "U" Cam Shaft Shift Gear (Star Wheel) (3193) without binding. Adjust through Eccentric Screw (181177) on the Universal Cam Shaft Segment (8130). (Check in all positions of the Universal Cam Shaft.)

NOTE: For "A" and "B" positions, hold the Detent Yoke (8448) (Ref. Adj. 50a, b) out until the Segment (8130) is fully actuated, then release the detent, and make required check. "C", "D" and "E" positions can be checked with the normal detent action.

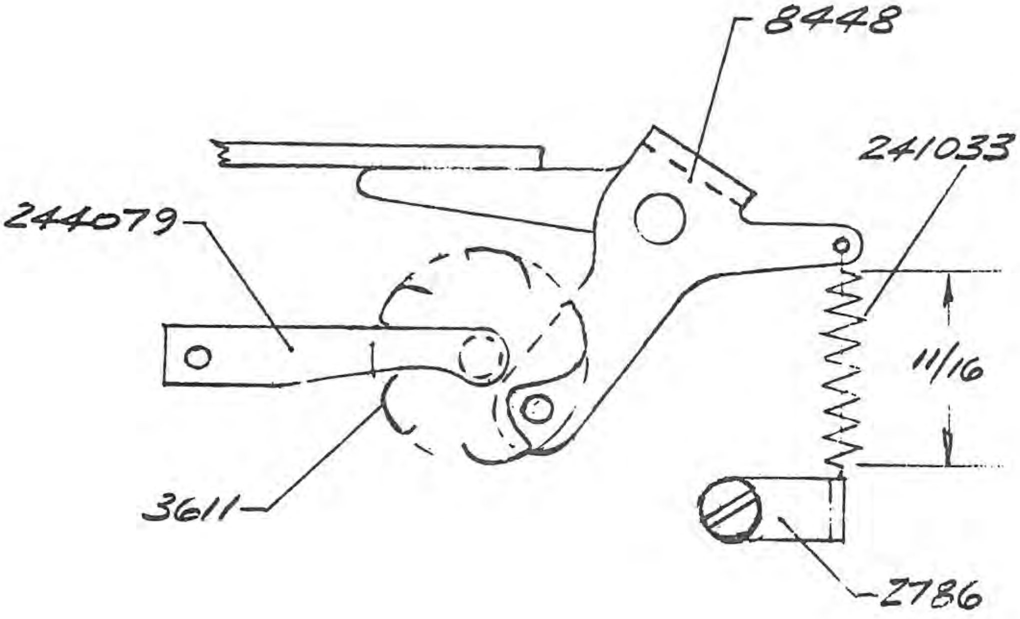


50. UNIVERSAL CAM SHAFT DETENT

a) See that the Universal Cam Shaft Detent Yoke does not bottom in the Detent Gear on the Universal Cam Shaft (3611) in"E" (normal) position. Check the Universal Cam Shaft for free to slide and the normalizing Springs (244079) to hold the Shaft in center position.

b) At A, B, C, and D positions of Universal Cam Shaft, the pin of Yoke (8448) must seat in detent notches of 3611.

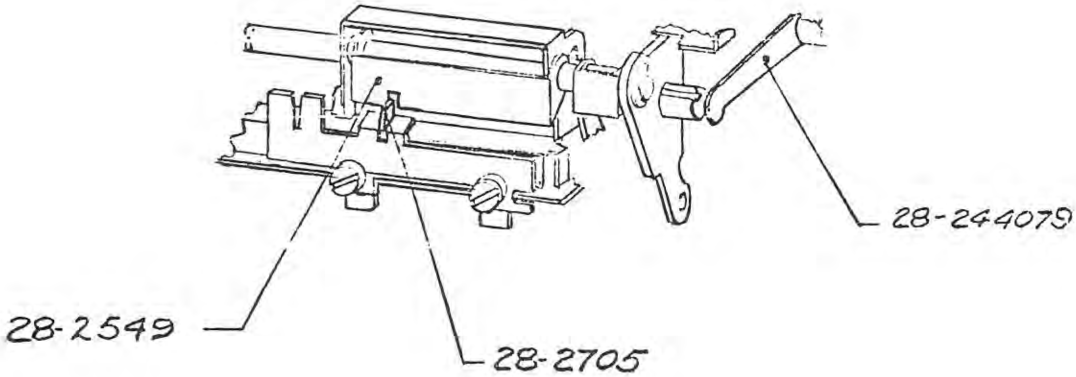
c) The Universal Cam Shaft Detent Yoke (8448) Spring going to Spring Clamp (2786), should measure 11/16" along the coils. Adjust spring length by rotating Bracket (2786) and retightening screw.



50. UNIVERSAL CAM SHAFT DETENT

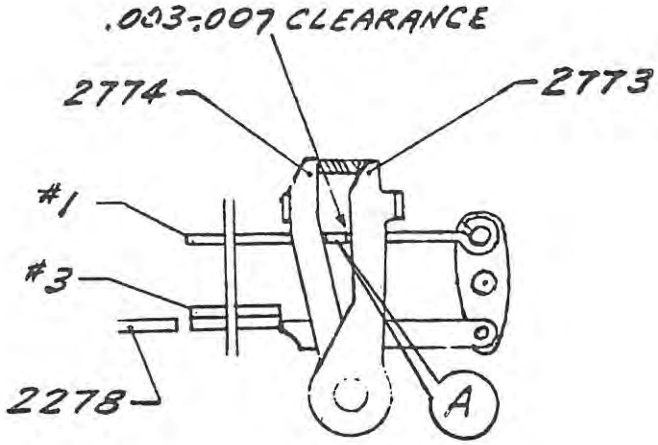
d) With Universal Cam Shaft at "E" (machine normal) position and shaft centralized, check that the Total Lock Slide (2705) enters the slot in Total Key Lock Slide Bail (2549) freely.

Universal Cam Shaft is centralized by adjustment of Leaf Springs (244079) at right and left ends of shaft.



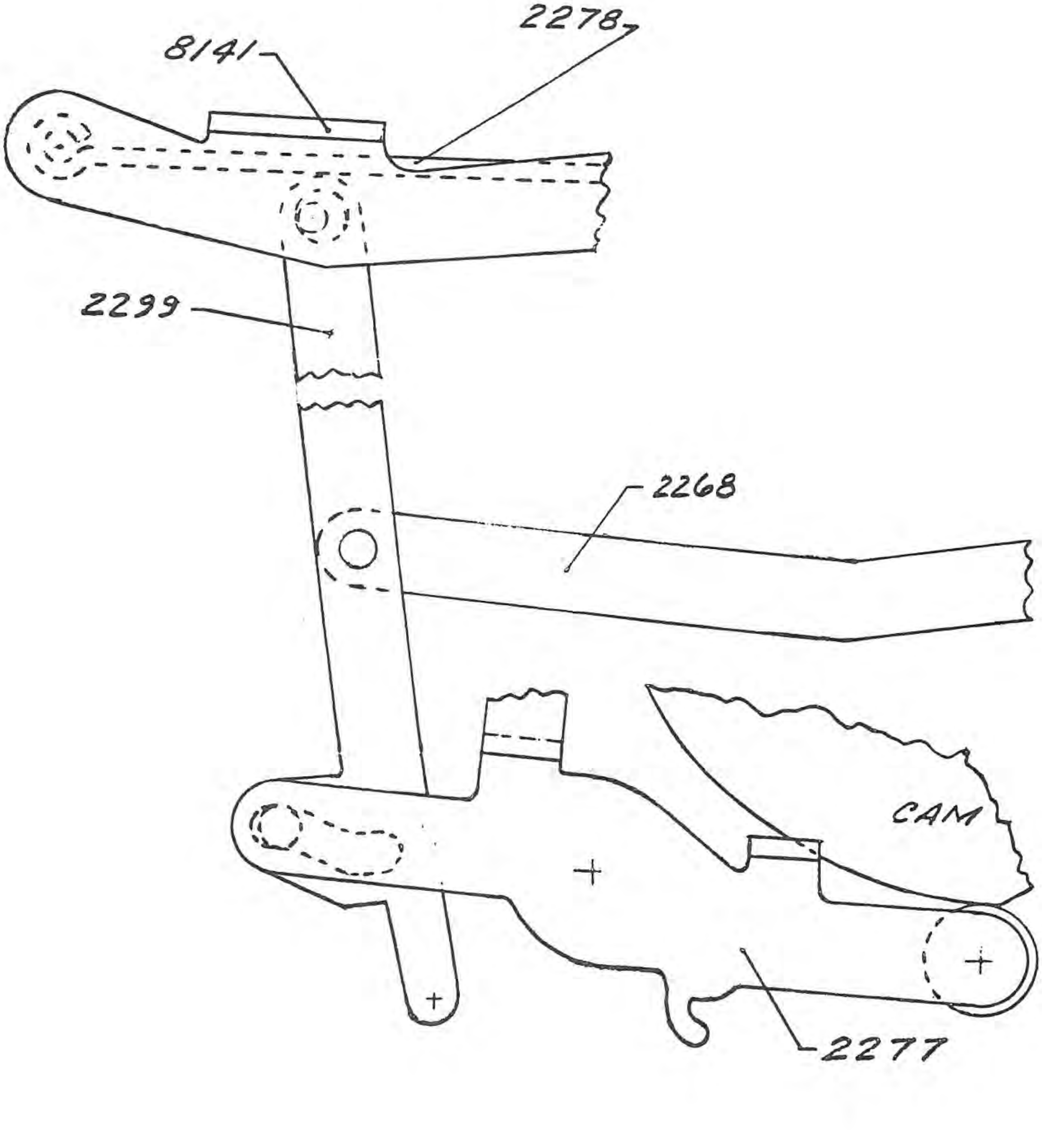
51. SLIDE NORMALIZERS (#1 Slide)

The #1 Slide Normalizers, Left (2774) and Right (2773), on the left side frame must limit on the lip of the top plate leaving .003 to .007 between the Normalizers and the tongue of the #1 Slide (2297) (Ref. A). To adjust form the Normalizers.



52. M & D LIFT ARM

a) Remove the Motor Idler Gear (8031) and check to see that the stud in the M & D Lift Arm (2277) is resting in the straight part of the slot in the M & D Lift Link Assembly (2299). Adjust through the eccentric on the front end of the Divisor M & D Lift Link Locator (2268). This adjustment to be made in conjunction with Adj. 52B and C.

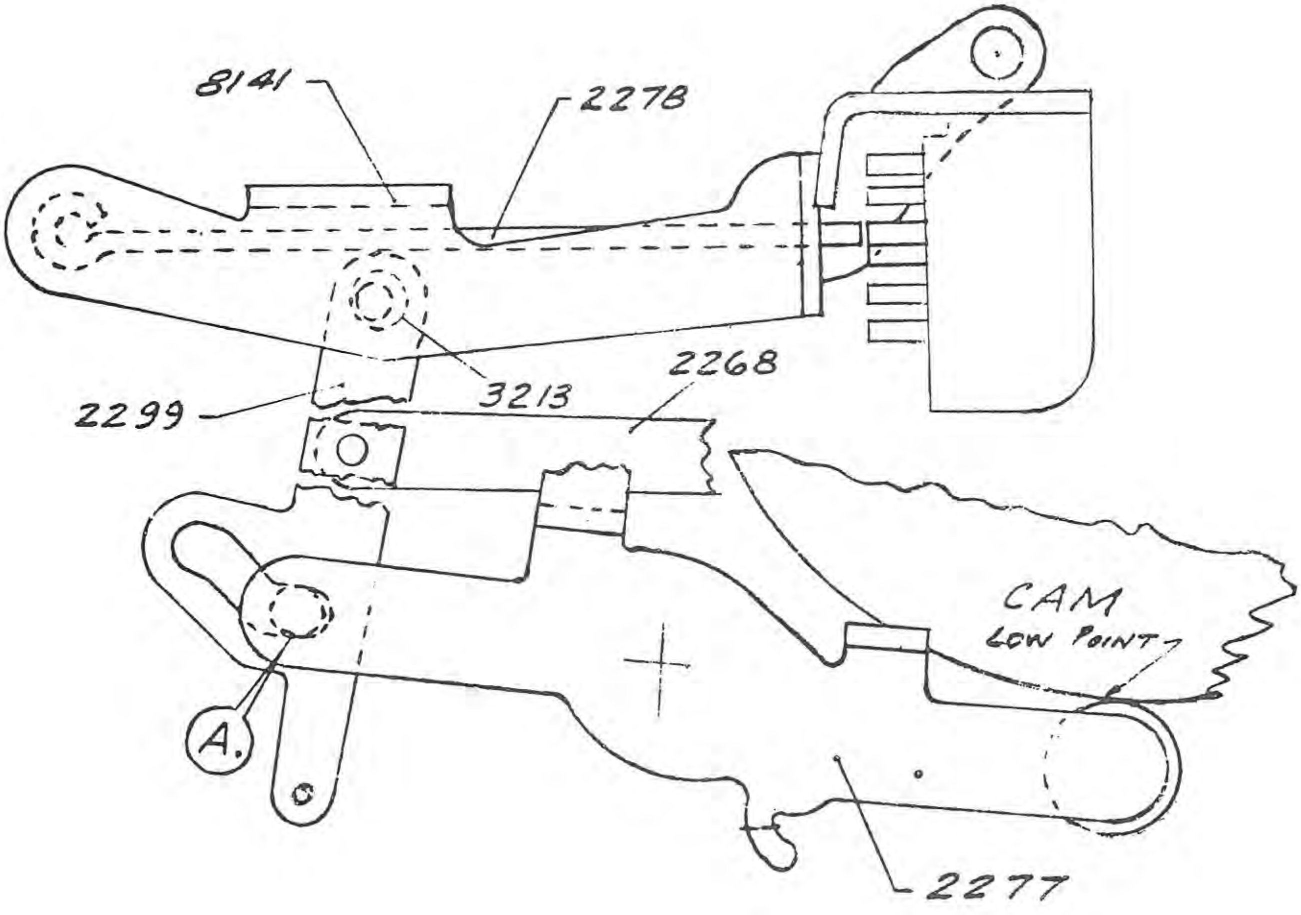


52. M & D LIFT ARM

b) With the Division Key latched down after 2nd depression, see that the bottom end of the M & D Lift Link Assembly (2299) has been moved to the rear so that the stud in the M & D Lift Arm Assembly (2277) is resting in the straight part of the slot (Ref. A). Adjust through the eccentric on the front end of the Divisor M & D Lift Link Locator (2268). Recheck Adj. 52A.

c) With the Division Key still latched down, turn the Main Shaft and check to see that the M & D Operating Arm (2278) has at least 2/3 engagement with the upper portion of the #3 Slide. Adjust through the M & D Arm Locator Arm Eccentric (3213) in the M & D Arm Locator Assembly (8141). This adjustment may have to be modified later. (See Adj. 57).

NOTE: When adjusting the Eccentric Stud (3213), the eccentricity should be positioned toward the Slides. After adjustment is made, recheck Adj. 52A & B.



52. M & D LIFT ARM

b) With the Division Key latched down after 2nd depression, the bottom end of the M & D Lift Link Assembly (8556) must be to the rear and the stud in the M & D Lift Arm Assembly (8608) must be resting in the straight part of the slot (Ref. A).

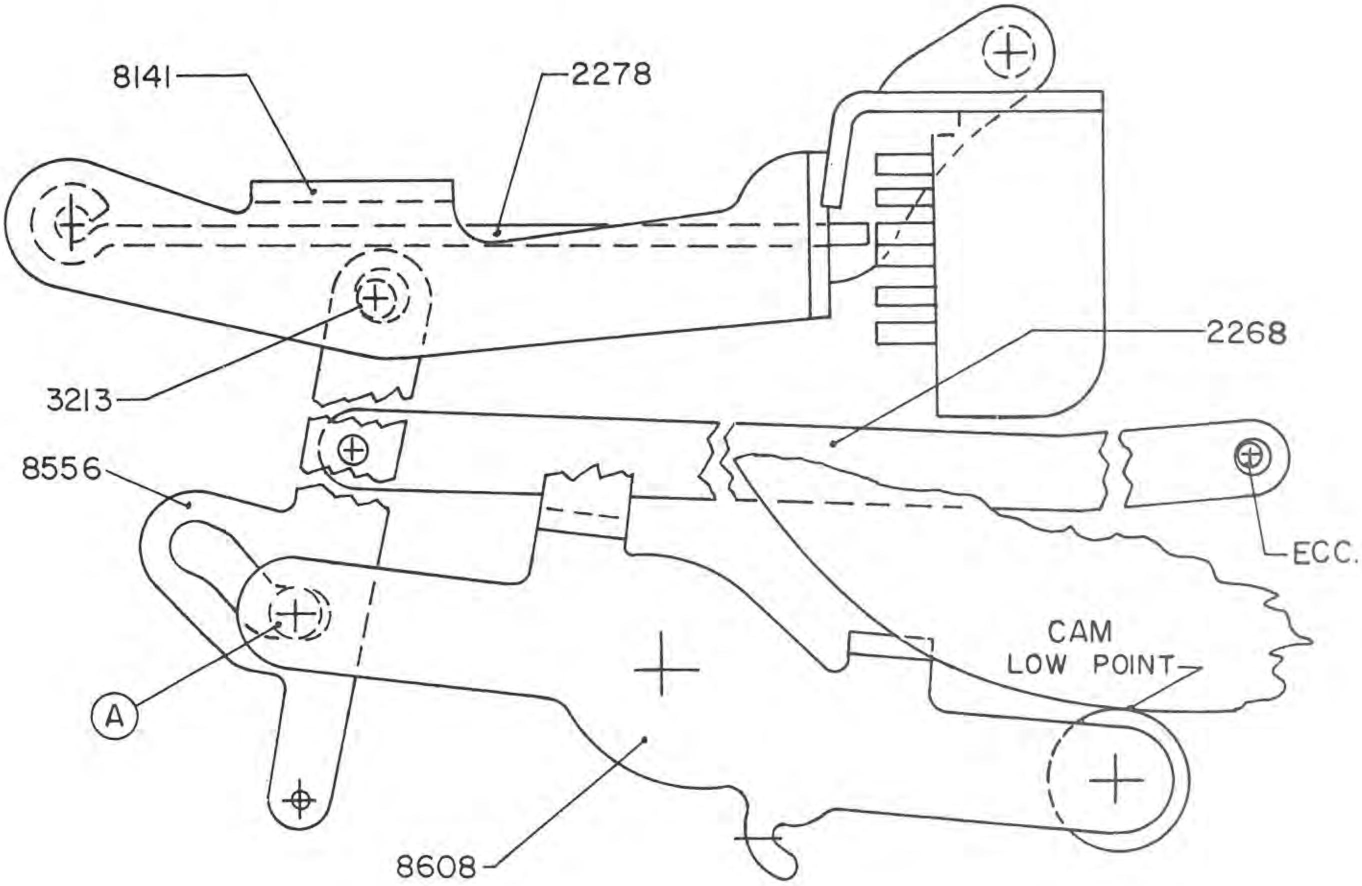
Adjust through the eccentric on the front end of the Divisor M & D Lift Link Locator (2268). Recheck Adj. 52a.

c) With the Division Key still latched down, turn the Main Shaft. The M & D Operating Arm (2278) must move into position to provide full to 2/3 engagement with the upper portion of the # 3 Slide.

Adjust through the M & D Locator Arm Eccentric (3213) in the M & D Arm Locator Assembly (8141).

NOTE: When adjusting the Eccentric Stud (3213), the eccentricity should be positioned toward the Slides.

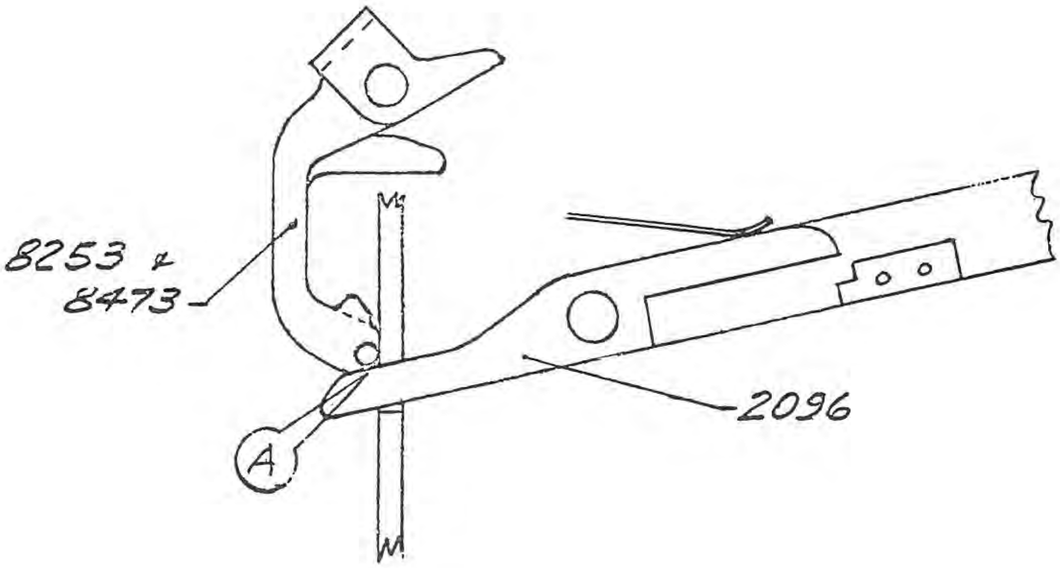
After adjustment is made, recheck Adj. 52a and b.



53. DRIVE RACK CONTROL YOKE

a) With the Universal Cam Shaft at normal, check the Multiply Drive Rack Control Bellcrank (8253) and the Total Drive Rack Control Yoke (8473) to release the Multiply Rack Actuator Finger (2096) and the Total Rack Actuator Finger (2096) without binds or drag. There must be .005 to .010 play between the studs of the Bellcrank (8253) and the Yoke (8473) and both Actuator Fingers (2096) when the Bellcrank and the Yoke are bottomed on the Front Plate. (Ref. A). Adjust by forming lower ends of the Bellcrank (8253) and the Yoke (8473).

NOTE: After adjustment 53C the Total Drive Rack Control Yoke (8473) may stop on the Total Drive Rack Control Link (2891) instead of bottoming on the Front Plate. This is acceptable.



53. DRIVE RACK CONTROL YOKE

b) Place the Universal Cam Shaft in "C" (Mult) position and check for at least .010 clearance between the Multiply Rack Actuator Finger (2096) and the stud in the Multiply Drive Rack Control Bellcrank (8253). (Ref. Fig. 1).

Adjust by peening the Control Bellcrank (8253) (Ref. A, Fig. 1). If peening adjustment is made, recheck Adj. 53a.

c) Place the Universal Cam Shaft in "D" (Mult) position, and adjust the Total Drive Rack Control Link (2891) to hold the Total Drive Rack Control Yoke (8473) .010 to .025 from the Total Rack Actuating Finger (2096).

Adjust by forming the Control Link (2891) (Ref. Fig. 2).

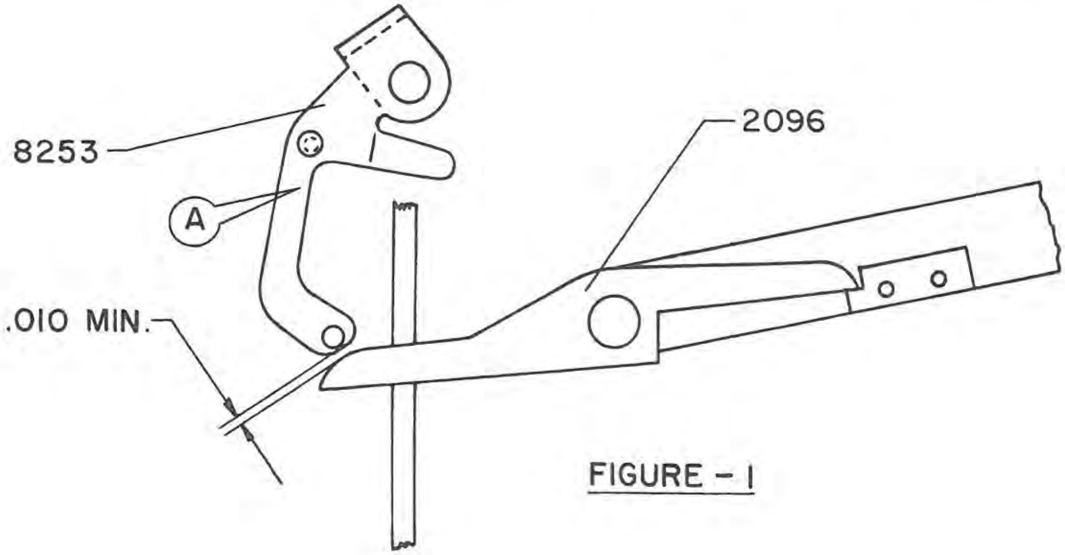


FIGURE - 1

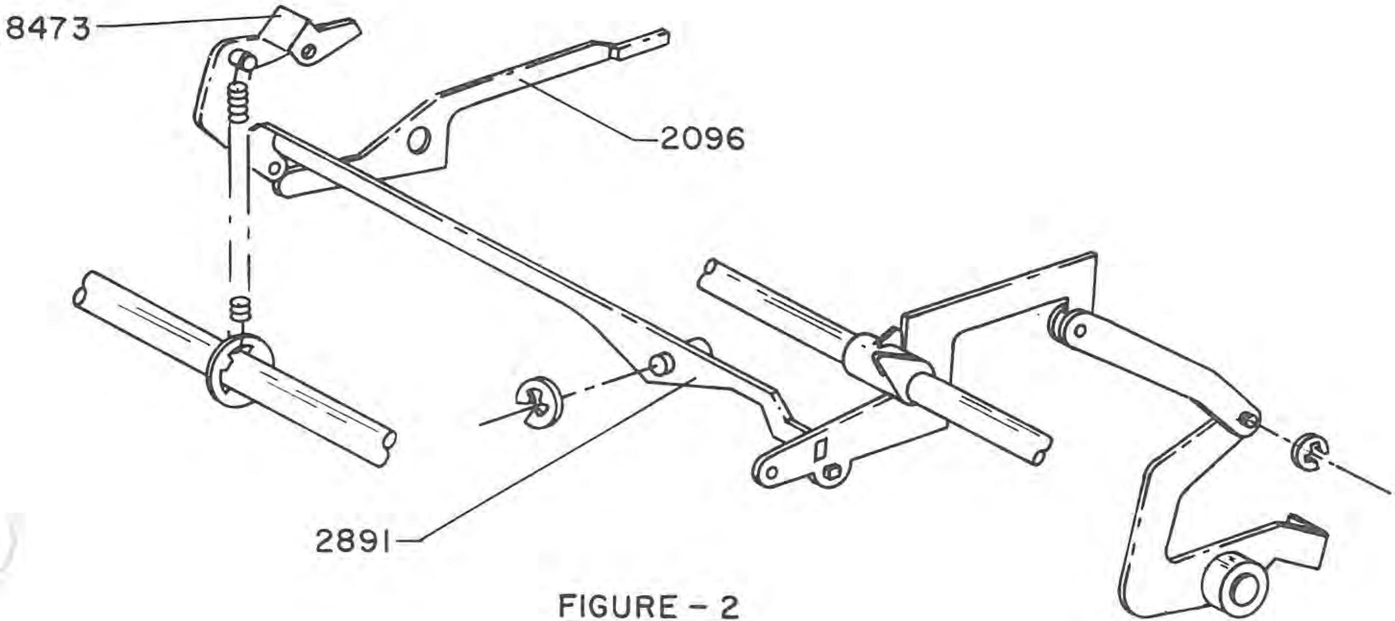
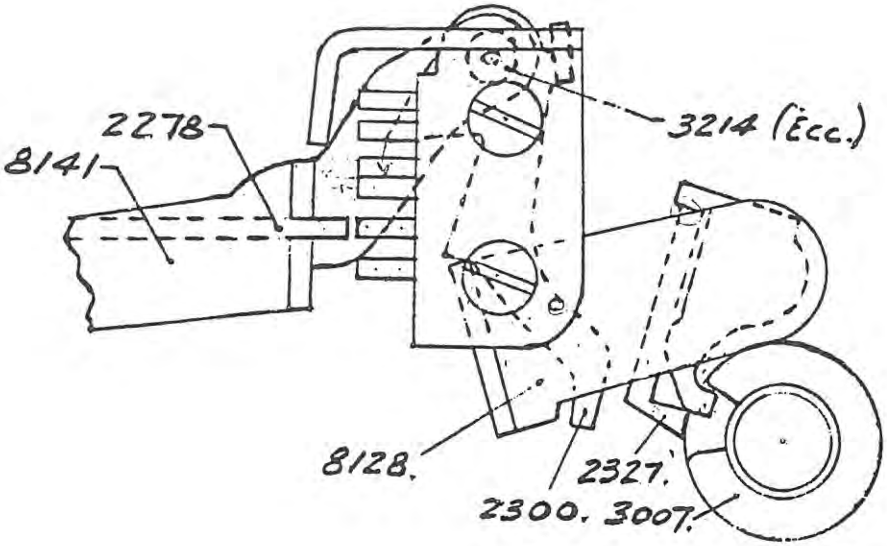


FIGURE - 2

54. SLIDE #4 ALIGNMENT

Enter "10" in keyboard and depress the Multiply Key. Depress the Multiply Key again. Turn the Main Shaft and with the Zero Drop in Bar (2327) resting on the flange of the second Multiply Gear (3007), the bottom of the M & D Operating Arm (2278) should be in line with the bottom of the #4 Slide (2295). Adjust through the Eccentric (3214) on the M & D Arm Locator Assembly (8141) to align. (Make sure of full engagement between the M & D Locator Hook (2300) and the M & D Arm Locating Plate (8128).



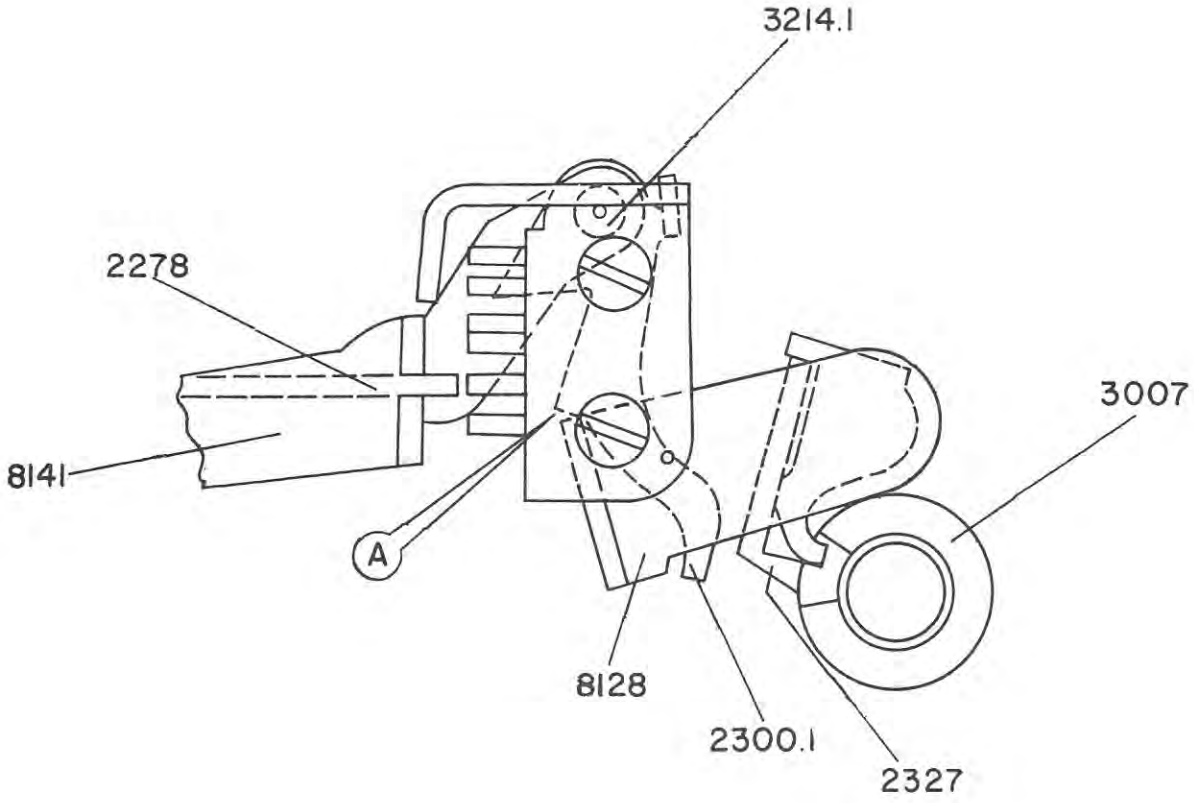
54. SLIDE # 4 ALIGNMENT

Enter "10" in keyboard, depress the multiply key and cycle machine. Depress the multiply key again and turn the main shaft.

When the Zero Drop-In Bar (2327) is resting on the flange of the second Multiply Gear (3007), the bottom of the M & D Operating Arm (2278) must be in line with the bottom of the # 4 Slide (2295).

Adjust through the Eccentric (3214.1) on the M & D Arm Locator Assembly (8141).

Make sure of full engagement between the M & D Locator Hook (2300.1) and the M & D Arm Locating Plate (8128) (Ref. A).



55. SLIDE #4 ACTION

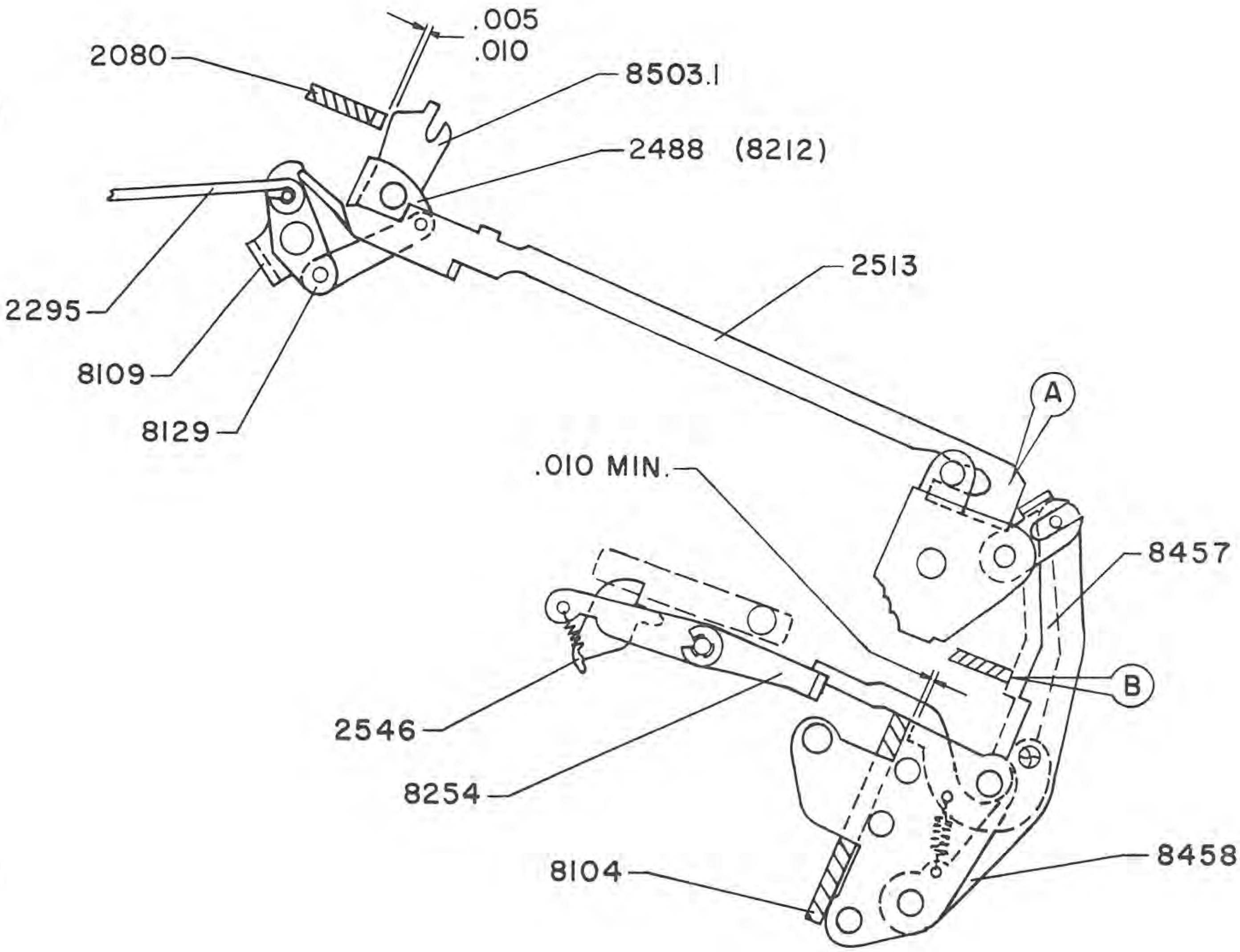
a) As the M & D Operating Arm (2278) pushes the #4 Slide (2295) forward, check for the movement of the Multiply List Control Shaft Actuating Arm (8457) to latch the Multiply List Unit Control Shaft Latch (2559) with not less than .010 clearance.

If clearance is not sufficient, peen the Actuating Link (2513) (Ref. A).

b) As the #4 Slide (2295) is actuated forward, the Escapement Finger (8503.1) must clear the teeth of the Escapement Rack (2080), by .005 to .010.

Adjust by twisting List Unit Forward Spacing Bail (2488) in Assembly (8212). Use Tool (ST-2000254) (two each). There must be slight further movement allowable in the M & D Mechanism Drive Arm when the #4 Slide is actuated fully forward.

c) With machine normal, the Actuating Arm (8457) must be against the bottom plate of the keyboard (Ref. B).



56. MULTIPLY COUNTER SEGMENT (SLIDE #1 & #3)

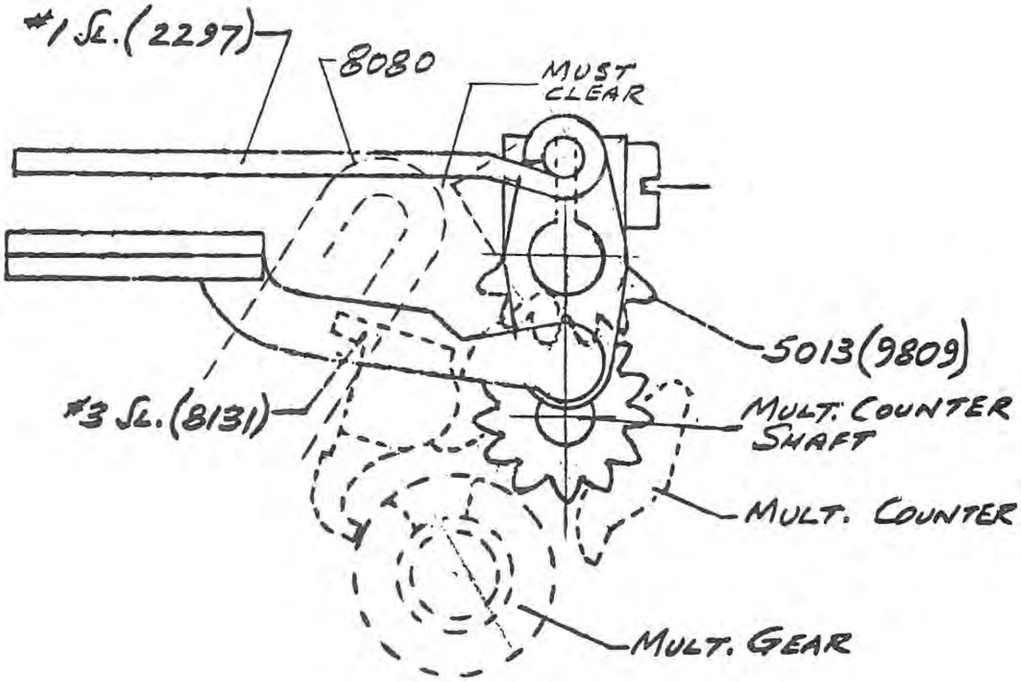
In Division, with the M & D Operating Arm (2278) pushing the #3 Slide (8131) all the way to the front, the Multiply Counter Shaft Assembly (9809) should have further movement. (With the M & D Operating Arm (2278) holding the #1 Slide (2297) (for Add Back in Division) all the way to the front, the Multiply Counter Shaft Assembly (9809) should also have further movement.) Adjust at the Multiply Counter Shaft Segment (5013) so that the further movement of #1 and #3 Slides is equalized.

NOTE: With the machine normal, the Segment (5013) should be centered with the Gear on the Multiply Counter Shaft as shown.

Inspection Check:

a. Divide 2 (full capacity) by 1. On the second cycle of the Main Shaft, after second depression of Division Key, check for the List Unit Reset Bellcrank (8080) to clear the Multiply Counter Shaft Segment (5013).

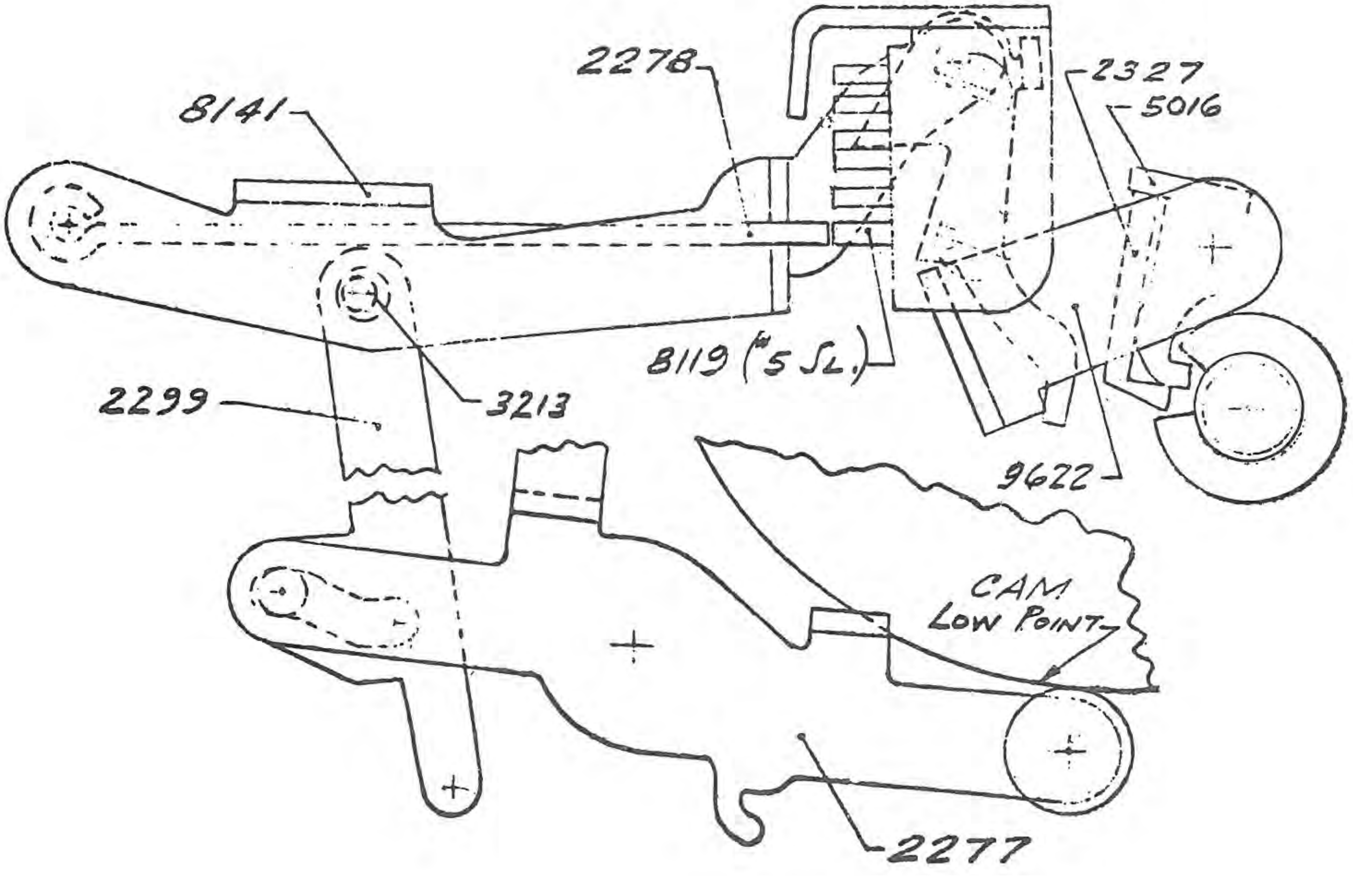
b. Divide 11111 by 1. Rotate the Main Shaft and check the Multiply Gear (3007) for feeding a full tooth in both directions and have further movement on the Multiply Counter Connector Shaft.



57. SLIDE #5 ALIGNMENT

With the Multiply Unit Clear, the M & D Operating Arm (2278) should line up with #5 Slide (8119) in such a manner as to have at least 1/3 engagement when fully actuated. Adjust through the M & D Locator Arm Eccentric (3213) in the M & D Arm Locator (8141). (See #3 Slide Adjustment in Adj. 52C).

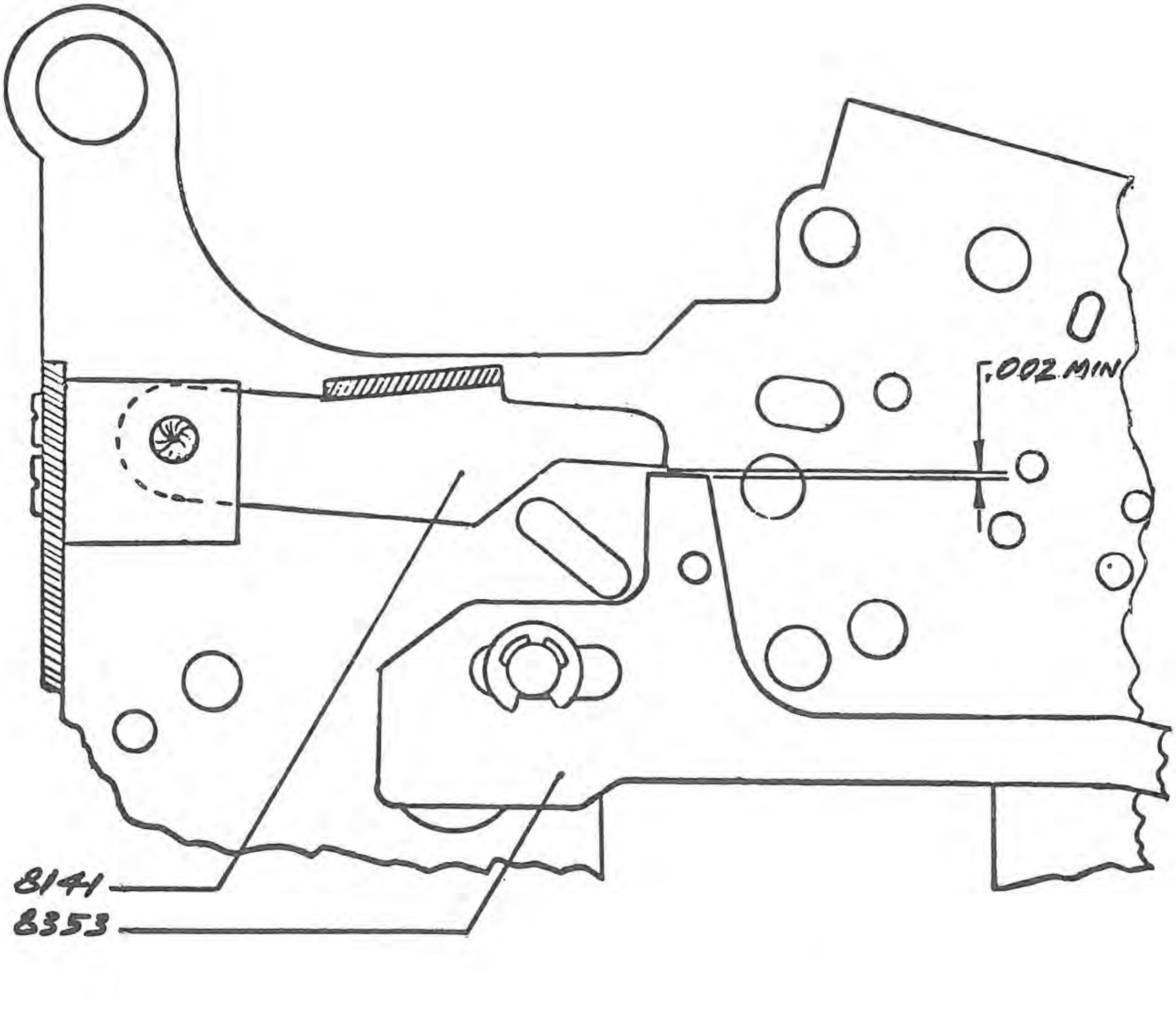
NOTE: When adjusting the Eccentric Stud, the eccentricity should be positioned toward the Slides. After adjustment is made, recheck Adj. 52A, B, & C.



58. STOP KEY

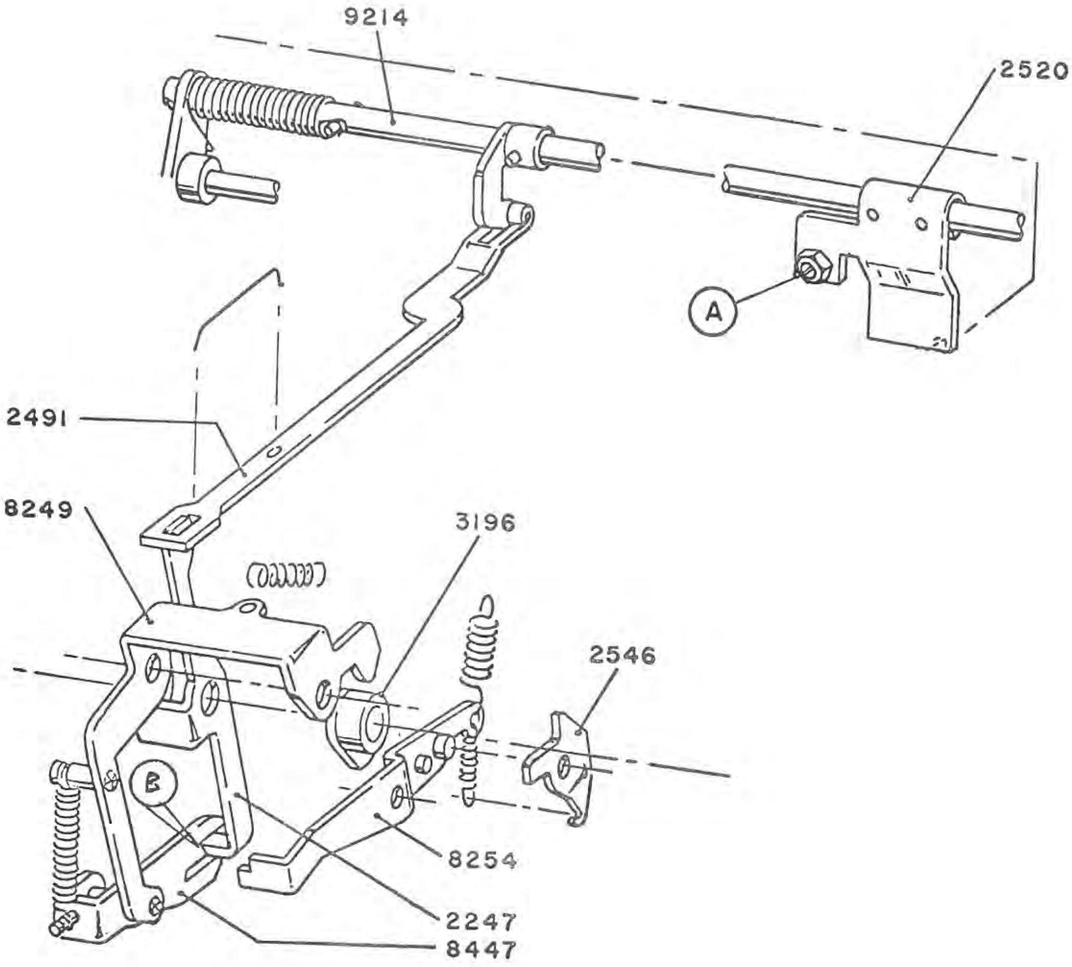
Depress Multiplication or Add Key and cycle machine until M & D Locator Assembly (8141) reaches its highest position. The Stop Key Link (8353) must pass under the M & D Locator Assembly with at least .002 clearance.

On Division, when Stop Key is depressed, the plunger of the M & D Locator Assembly must line up with #2 slide with at least 3/4 hold when the M & D Locator Assembly is limited by Slide (8353).



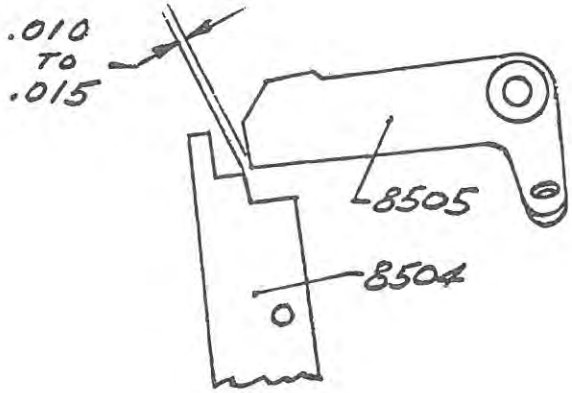
59. NON ADD

Adjust the Limit Screw (Ref. A) in the Non Add Flange (2520) to allow the Non Add Latch Link (2247) to overthrow its latching point (Ref. B) by .010 - .015. Push upper part of the Non Add Latch Link (2247) to the rear lightly to take up lash while adjusting.



60. HOOKS - MULTIPLY GEARS

The Multiply Gear Hook Control Actuator (8504) must release the Multiply Gear Hook Control Actuator Lever (8505) and have .010 to .015 clearance at the end of the forward stroke. Release time of the Multiply Gear Hook Control Actuator (8504) is adjusted by twisting the Actuator (8504).



60. HOOKS - MULTIPLY GEARS

a) With the machine normal, check for .005-.010 clearance between the Mult. Gear Hook Control Actuator Lever (8505) and the step on Mult. Gear Hook Control Actuator (8504).

Adjust by means of the Eccentric (3761). (Ref. Fig. 1).

b) With the Universal Cam Shaft at "C" position (Mult.), and the Rack Reset Bellcrank (8028) fully to the rear (end of forward stroke) check for the Multiply Gear Hook Control Actuator to have released from and clear the Multiply Gear Hook Actuator Lever (8505) by .010 - .015 (Ref. Fig. 2).

Adjust by twisting the Multiply Gear Hook Control Actuator (8504).

NOTE: To check this clearance at the end of the forward stroke, manually actuate the Multiply Gear Hook Control Bail (8621) to move the Actuator (8504) down until the clearance specified can be observed.

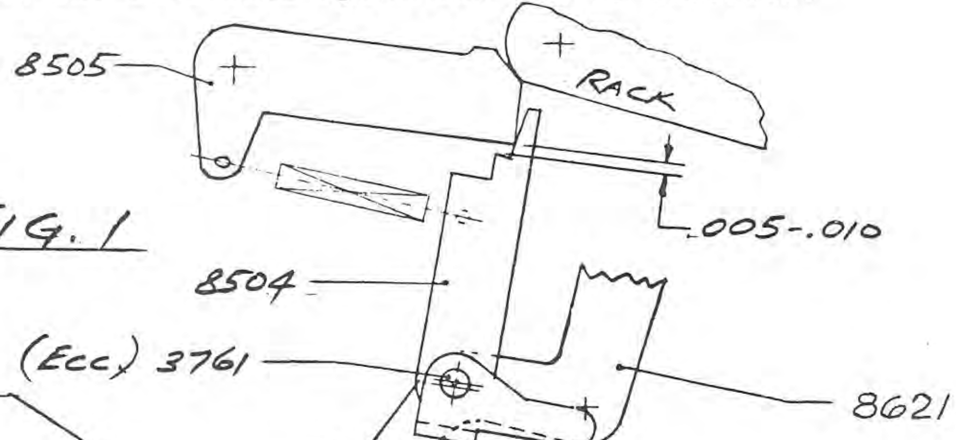


FIG. 1

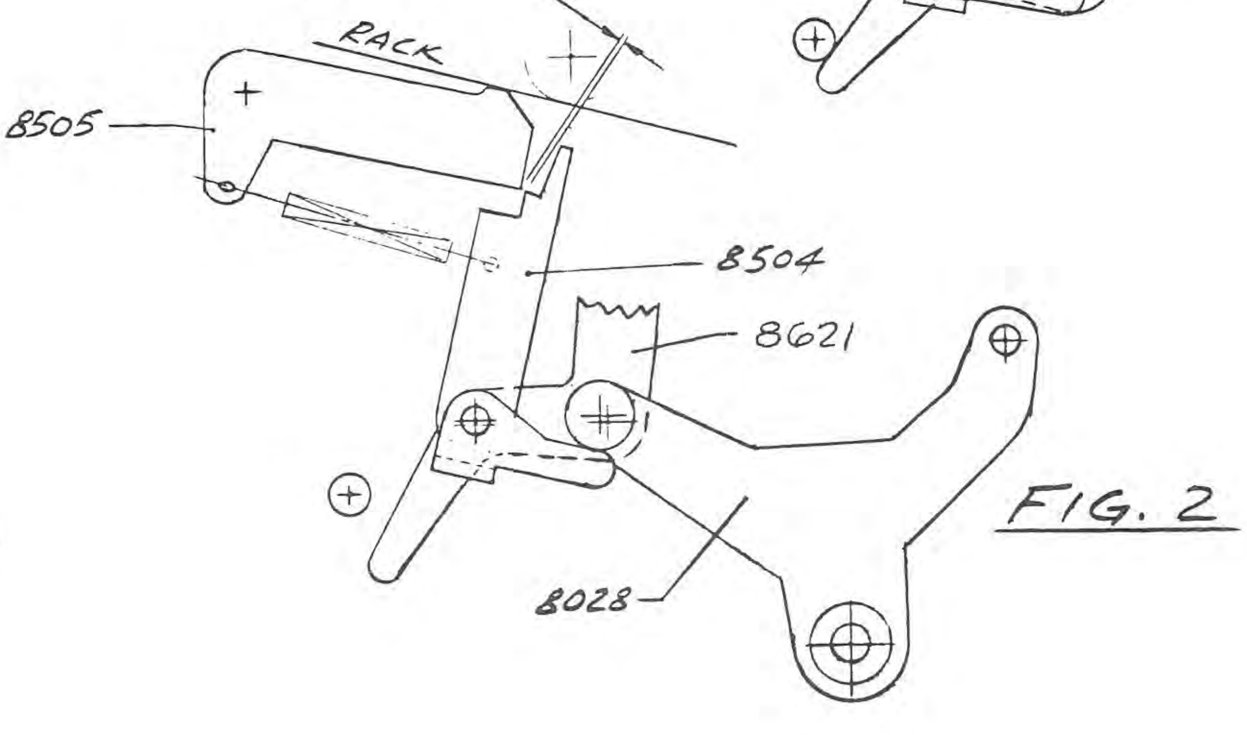


FIG. 2

61. LIST UNIT ACTUATOR HOOK CONTROL - MULT. AND DIV.

a) Adjust the Multiply List Unit Forward Stroke Control Adjusting Plate (2841) on the List Unit Forward Stroke Slide (2867) so that the Slide clears the List Unit Actuator Hook-Forward Stroke (2874) on the Assembly (8035) by .040 -.060, when the Multiply List Unit Control Shaft (9712) is latched (Ref. Fig. 1). Check the Slide (2867) to be free of binds in Division as the "U" Cam Shaft rotates from "A" to "B" (L.U. disengagement for blank stroke.)

b) With the Multiply List Unit Control Shaft (9712) unlatched, check to see that the Multiply List Unit Control Slide Finger (8422) just contacts the List Unit Return Hook (2929). Adjust by forming the rear half of the Multiply List Unit Return Stroke Control Link (2817) (Ref. Fig. 2). Check the Multiply List Return Stroke Control Slide (8498) for freeness and to just contact the lug on the Slide (8186) (Ref. A Fig. 3). If necessary, form lug.

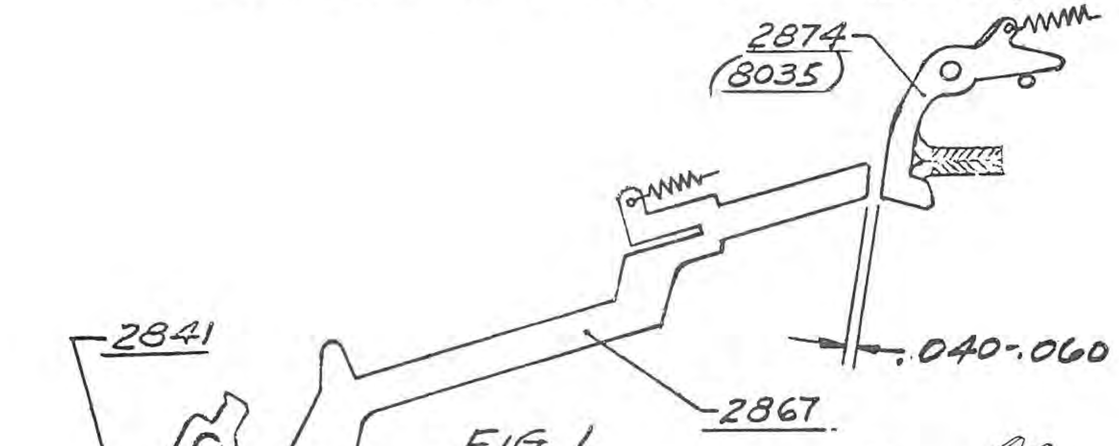


FIG. 1

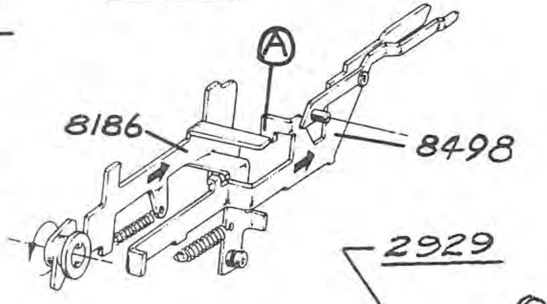


FIG. 3

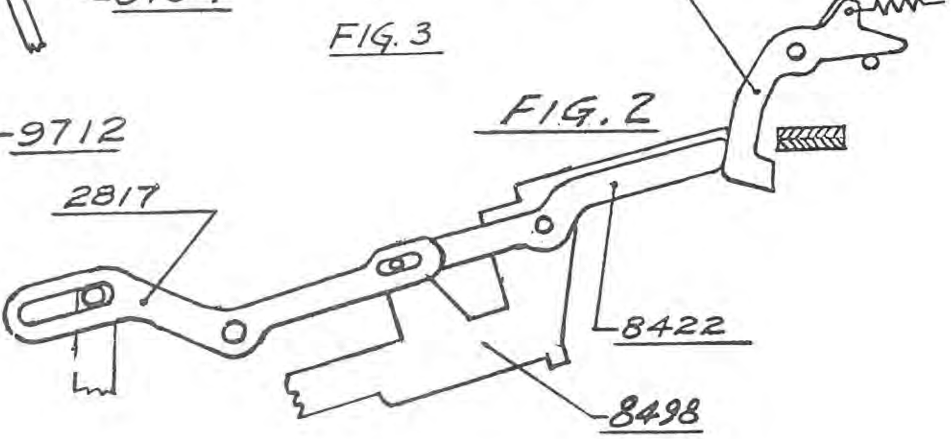


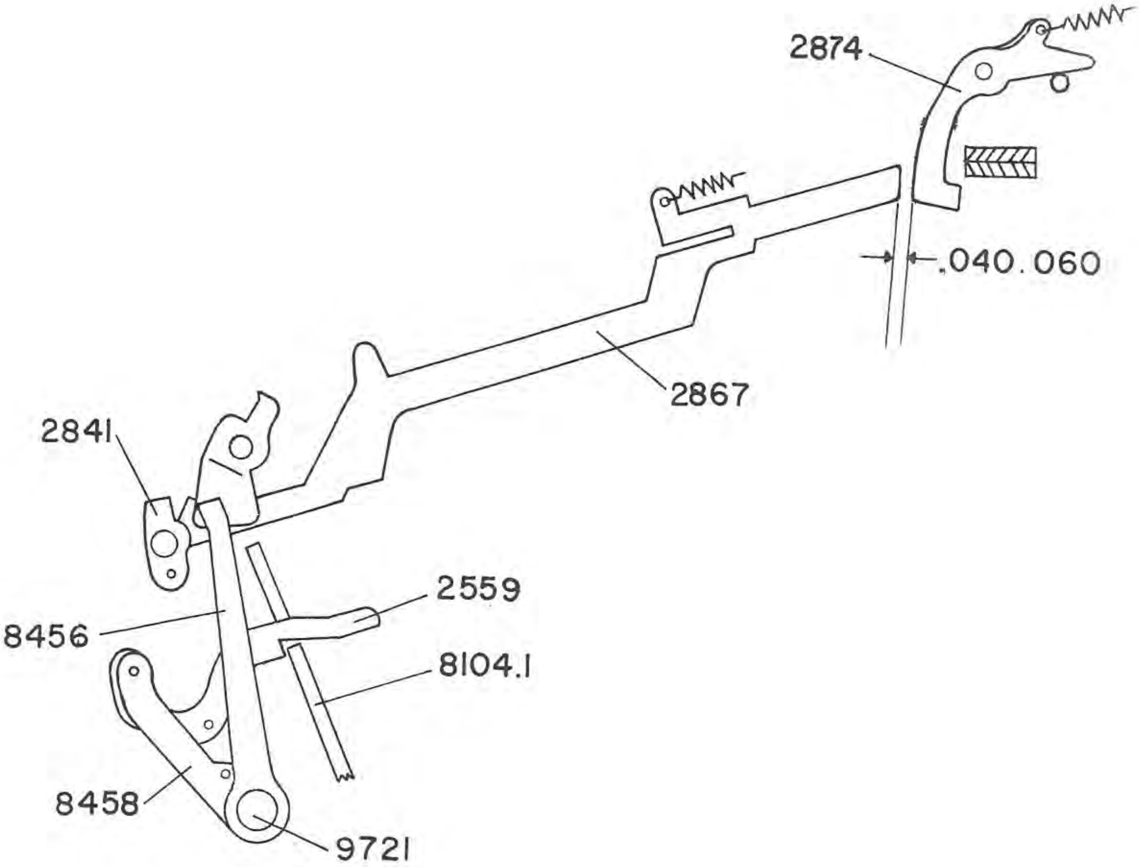
FIG. 2

61. LIST UNIT ACTUATOR HOOK CONTROL - MULT. and DIV.

a) When the Multiply List Unit Control Shaft (9721) is latched, the List Unit Forward Stroke Slide (2867) must clear the List Unit Actuator Hook-Forward Stroke (2874) by .040-.060.

Adjust by repositioning the Adjusting Plate (2841) on the Forward Stroke Slide (2867).

The Forward Stroke Slide (2867) must be free of binds as the Universal Cam Shaft rotates from "A" to "B" in division. (List Unit disengagement for blank stroke)



61. LIST UNIT ACTUATOR HOOK CONTROL - MULT. AND DIV.

b) With the Multiply List Unit Control Shaft (9721) unlatched, the Control Slide Finger (8422) must just contact the List Unit Return Hook (2929).

Adjust by peening the rear half of the Control Link (2817) (Ref. Fig. 1).

The Control Slide (8498) must be free and just contacting the lug on the Slide (8186) (Ref. A, Fig. 2).

If necessary, form the lug (Ref. B) on Slide (8186). The Slide (8186) must be free after adjusting.

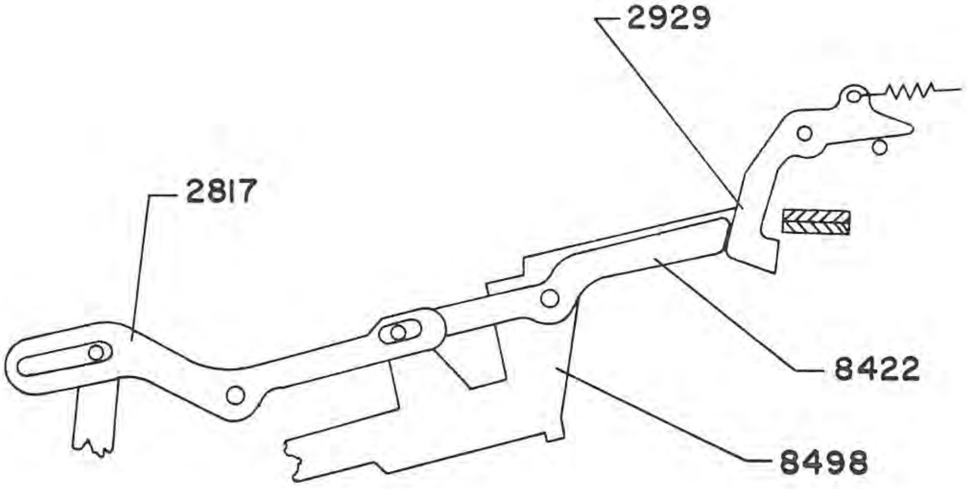


FIGURE - 1

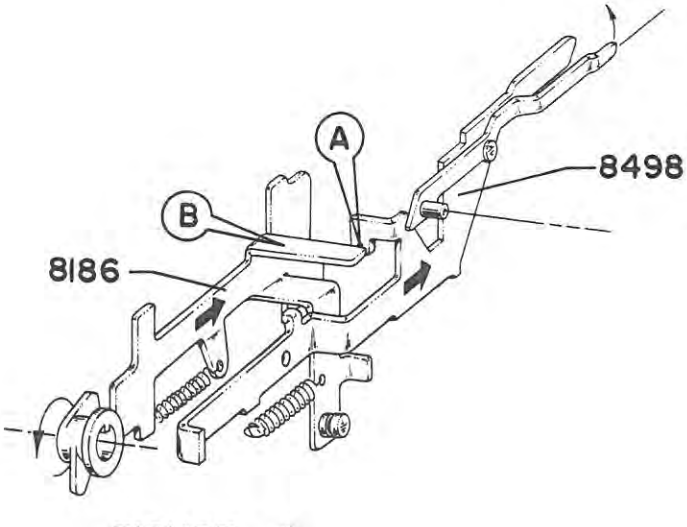
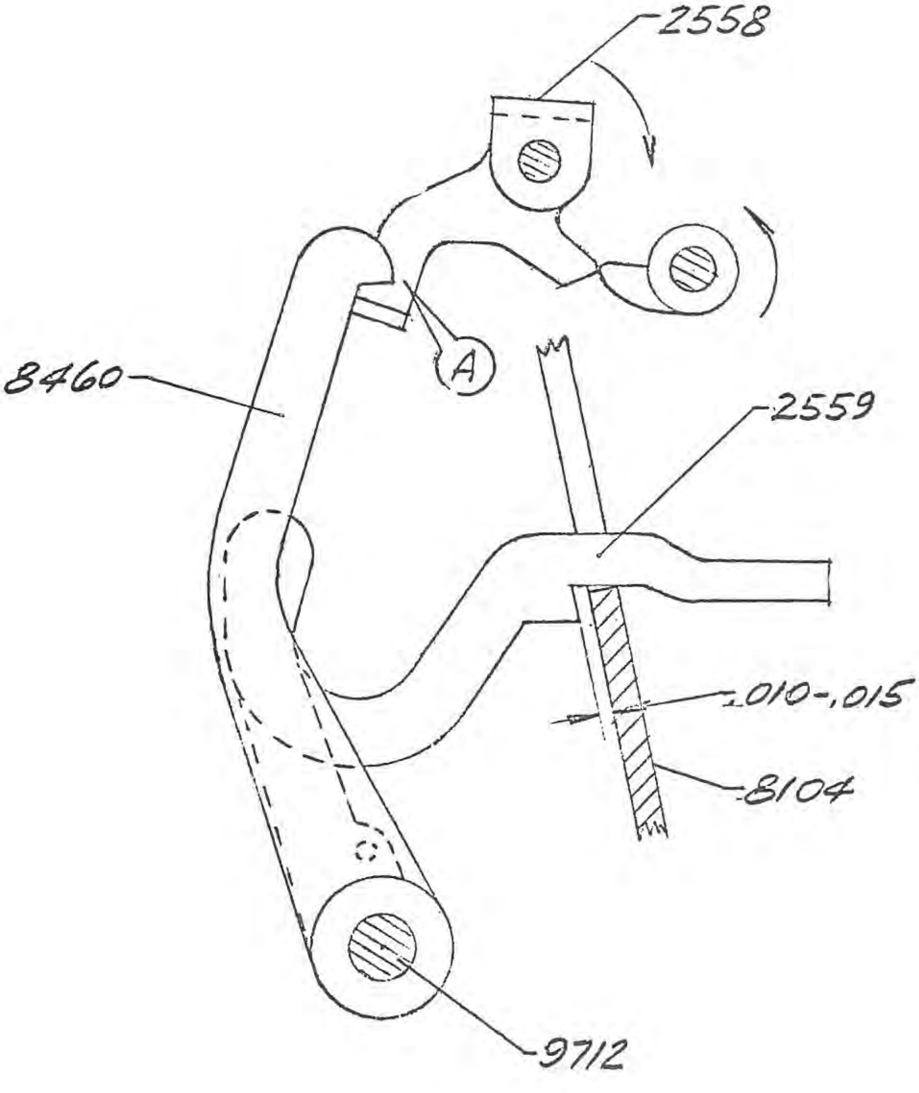


FIGURE - 2

62. LIST UNIT CONTROL SHAFT

In Division, as the "U" Cam Shaft rotates from "A" to "B", the Division List Unit Control Yoke (2558) must throw the Division List Unit Control Arm (8460) far enough to actuate the Mult. List Unit Control Shaft Latch (2559) from .010 to .015 past its latching point on the Front Plate (8104).

Adjust by forming extension of the Division List Unit Control Yoke (2558) (Ref. "A") (Refer to Adj. 55b and 80c for other latching specifications for Latch (2559).



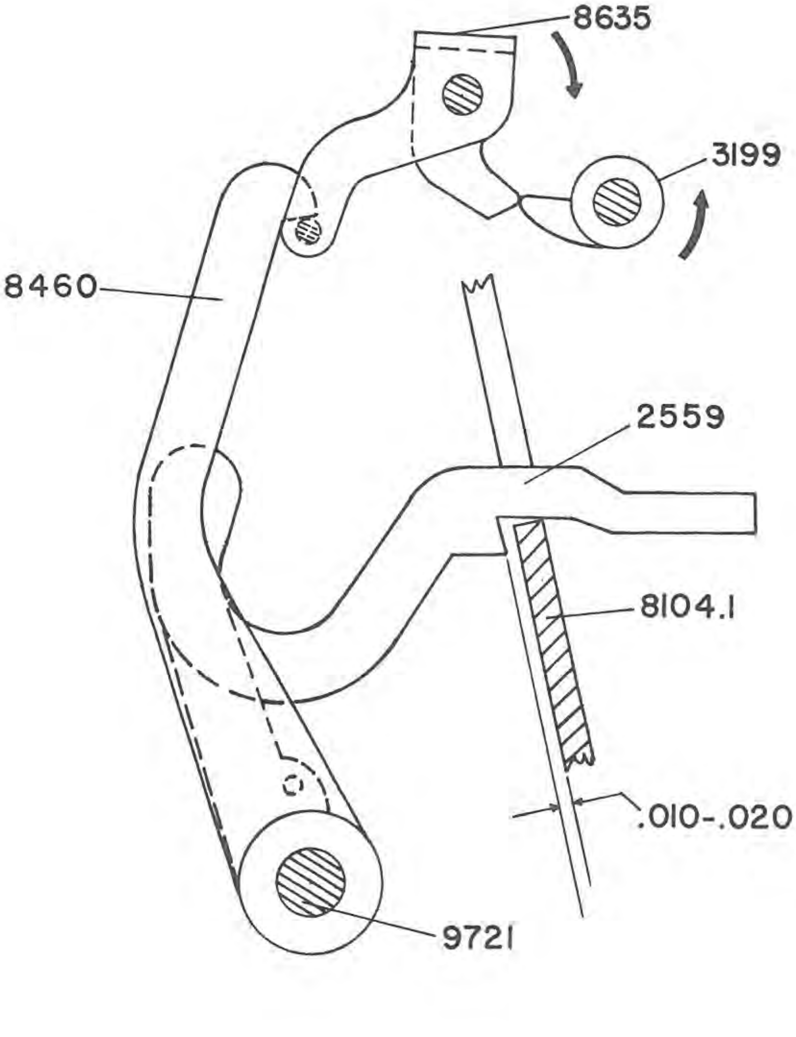
62. LIST UNIT CONTROL SHAFT

In division, as the Universal Cam Shaft rotates from "A" to "B" the Division List Unit Control Yoke (8635) must throw the Division List Unit Control Arm (8460) far enough to actuate the Multiply List Unit Control Shaft Latch (2559) .010-.020 past its latching point on the Front Plate (8104.1).

Adjust by forming the Control Yoke (8635).

There must be further movement allowable in the List Unit Control Shaft mechanism when the Control Yoke (8635) is on the high point of the Cam (3199).

In unlatched position, the Actuating Arm (8457) must be against the bottom plate of the keyboard (Ref. Illus. Adj. 55 & 80c) and the Control Yoke (8635), when held against the ball housing or the keyboard, must not interfere with the hub on the Cam (3199) to prevent lateral shift of the Universal Cam Shaft.



63. DIVISOR LOCATOR

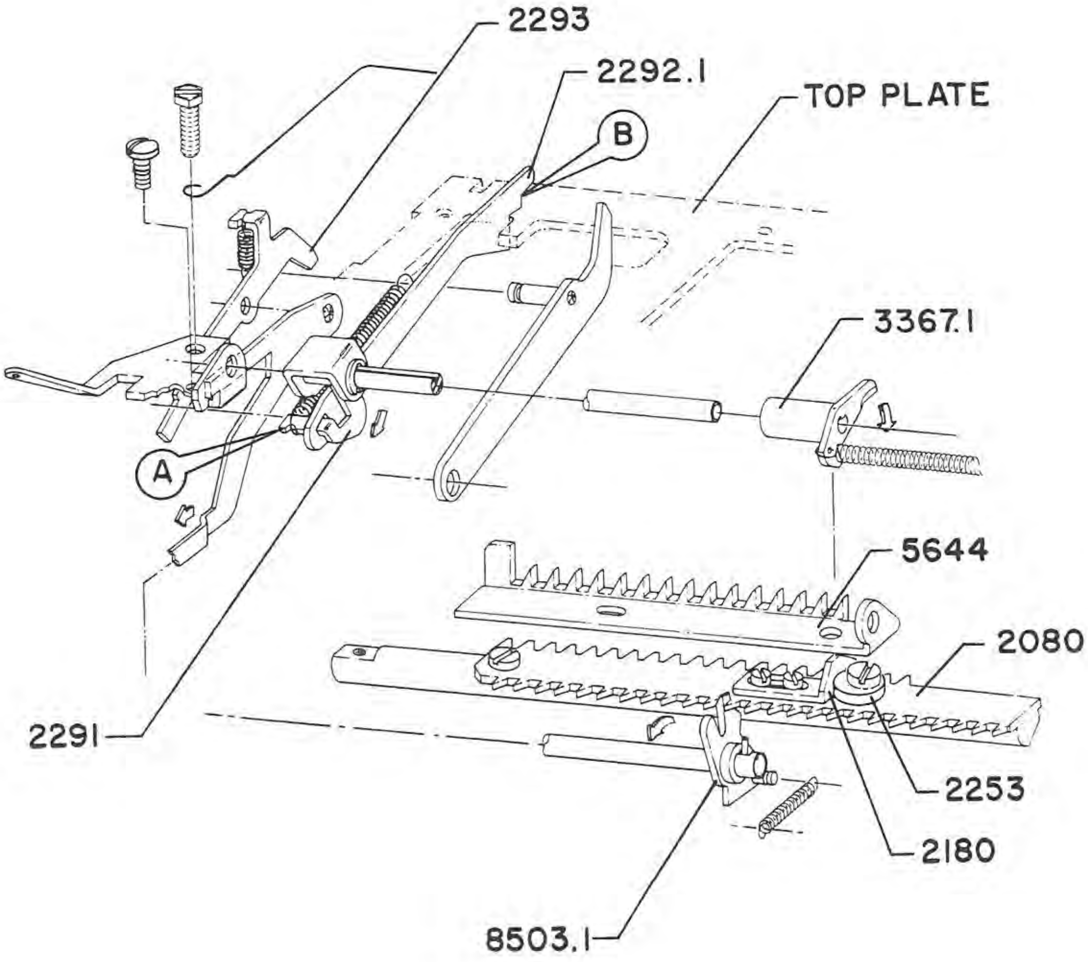
a) The Divisor Locator Shaft Actuator (2293) must be free to latch on the tail of the Divisor Locator Shaft Rotating Arm (2291) (Ref. A).

b) Index a Figure. Depress the Division Key slowly and check for the Divisor Locator Shaft Control Latch (2292.1) to latch on the top plate before the clutch is tripped. (Ref. B).

c) As the Division Key is depressed, check for the Divisor Locator Arm (3367.1) to drop into the teeth of the Divisor Locator Rack (5644) and clear the straight side of the tooth by .004 to .007.

Adjust the Eccentric Washer (2253) to position the Divisor Locator Plate (2180) properly.

When an overcapacity divisor entry is made, the Escapement Dog (8503.1) must not re-enter the Escapement Rack (2080) (Check with power off).



64. SLIDE #1 ALIGNMENT

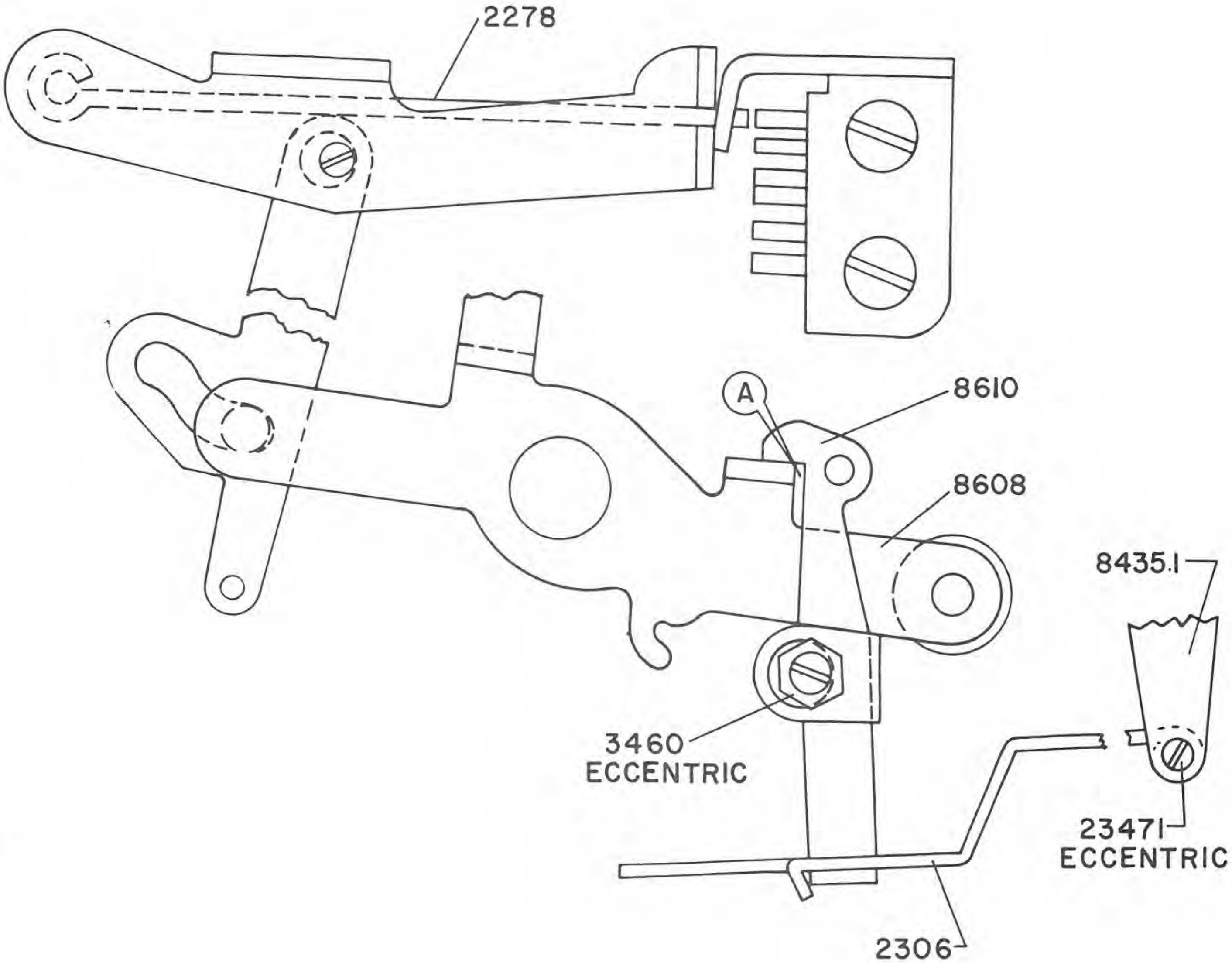
a) With the machine in Division Add Back condition, turn the Main Shaft and check for the M & D Operating Arm (2278) to align with the #1 Slide.

Adjust through the Eccentric (3460) in the Left Side Frame.

b) As the Division M & D Lift Mechanism Latch Control (2306) is operated to its maximum forward travel, there must be enough clearance (Ref. A) between the Division Add Back M & D Lift Latch (8610) and the M & D Lift Arm (8608) to prevent binds in the mechanism.

Adjust by means of Eccentric (23471).

Latch (8610) must also have secure hold on lip of Lift Arm (8608).

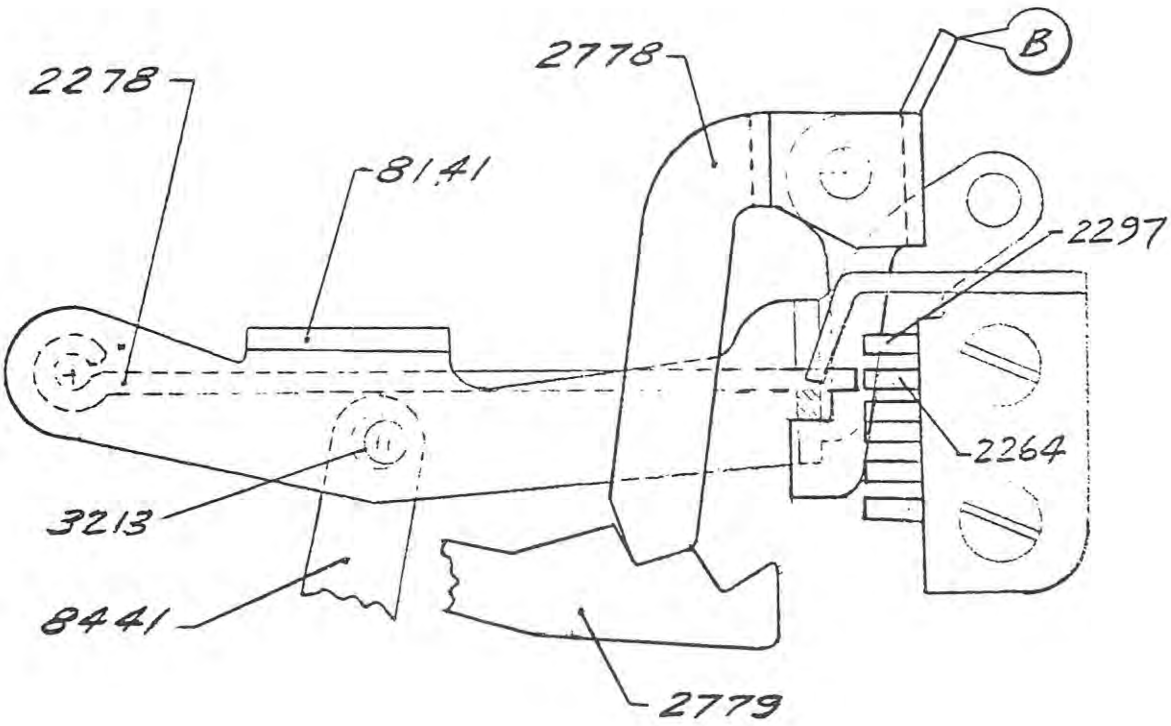


64. SLIDE #1 & #2 ACTION

c) Move the #1 Slide (2297) forward until the M & D Arm Div. Locator Yoke (2778) escapes past the high point of the Div. Locator Yoke Detent (2779). There should be further movement of the #1 Slide (2297). Adjust by twisting the Locator Yoke (2778).

d) In Back Space Cycle, move the #2 Slide (2264) forward until the M & D Divisor Locator Yoke (2778) escapes past the high point of the Divisor Locator Yoke Detent (2779). There should be further movement of the #2 Slide (2264). Adjust by forming the extension on the Locator Yoke (2778) (Ref. B).

e) In Back Space cycle, the #2 Slide action must release the Divisor Locator Shaft Control Latch (2292) from the Top Plate (Ref. Adj. 63B).



64. SLIDE #1 & #2 ACTION

c) Move the #1 Slide (2297) forward until the M & D Arm Div. Locator Yoke (2778.1) escapes past the high point of the Div. Locator Yoke Detent (2779).

There should be further movement of the #1 Slide (2297).

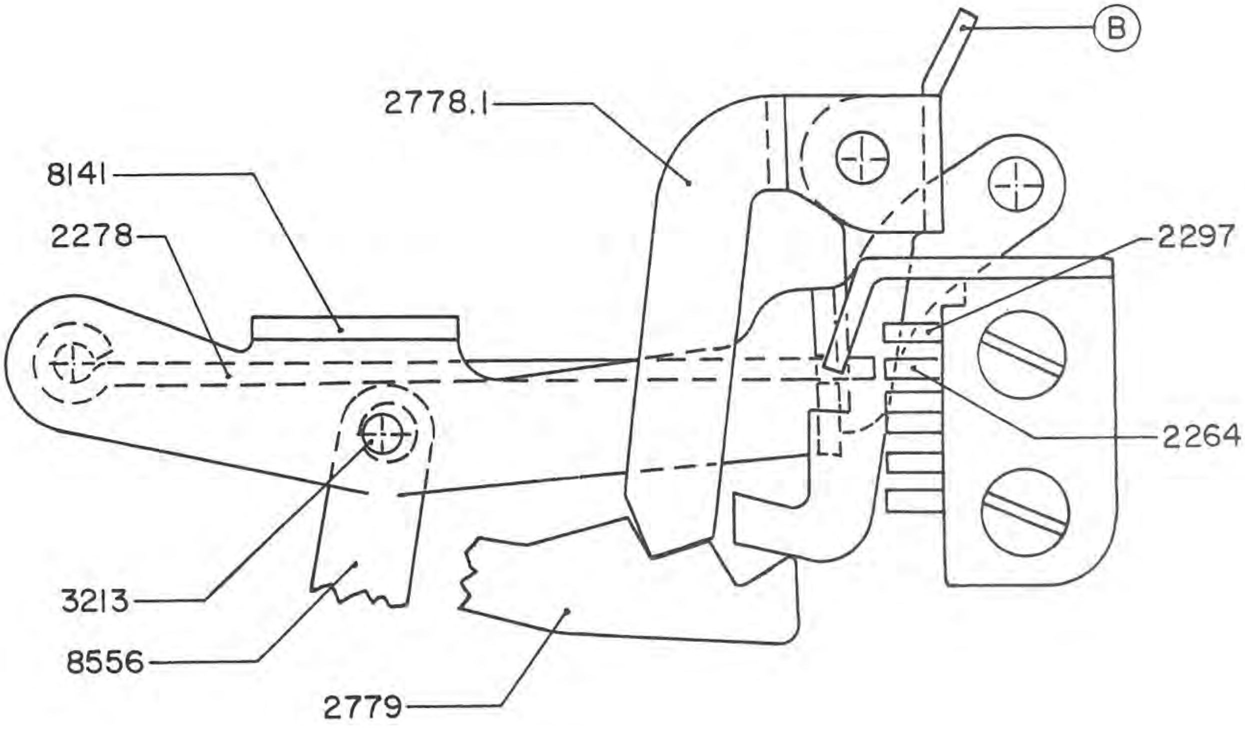
Adjust by twisting the Locator Yoke (2778.1).

d) In Back Space Cycle, move the #2 Slide (2264) forward until the M & D Arm Divisor Locator Yoke (2778.1) escapes past the high point of the Divisor Locator Yoke Detent (2779).

There should be further movement of the #2 Slide (2264).

Adjust by forming the extension on the Locator Yoke (2778.1) (Ref. B).

e) In Back Space cycle, the #2 Slide action must release the Divisor Locator Shaft Control Latch (2292) from the Top Plate (Ref. Adj. 63b).



65. DIVISION ESCAPEMENT TRIP

a) With the Universal Cam Shaft normal, depress the Division Key slowly and check for the Division Escapement Trip Finger (2402) to pass over the lip of the Division Escapement Shaft Trip Arm (2522) (Fig. 1, Ref. A). It must be possible to feel slight up and down movement of Finger (2402) at this time.

b) With the Universal Cam Shaft in "A" position, the M & Q Finger Locator (2494) must not be in contact with Finger (2402) (Fig. 2).

The Trip Finger (2402) will have a full hold on Arm (2522) with condition above.

Adjust for this condition and for 65a by forming Locator (2494).

c) The Escapement Finger (8503.1) must clear the Escapement Rack teeth by .005 to .010 while the Division Key is latched down.

Adjust by forming the lip of the Division Escapement Trip Shaft Arm (2522). The Escapement Shaft and Escapement Finger must not be cramped when the Division Key is depressed fully.

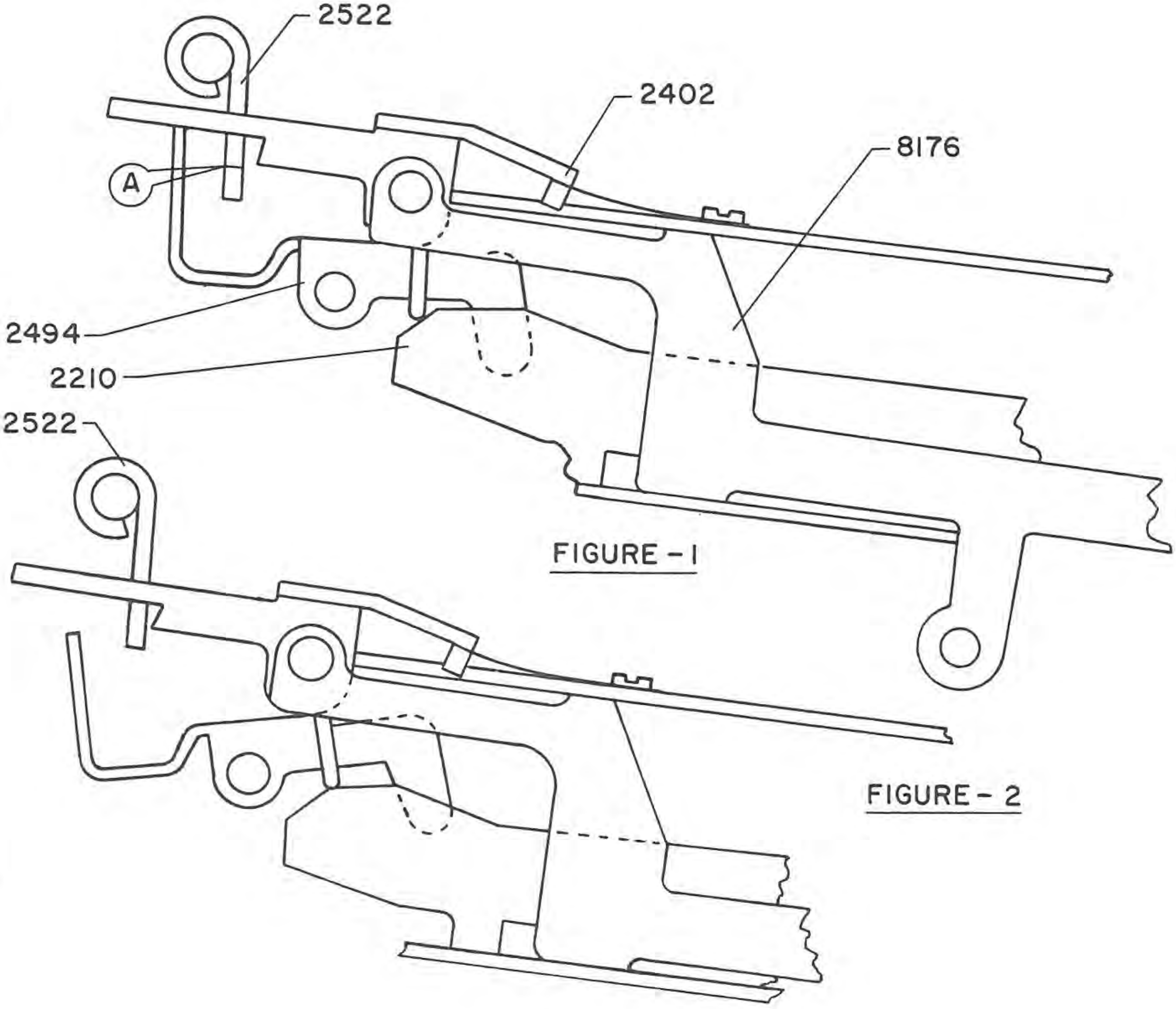


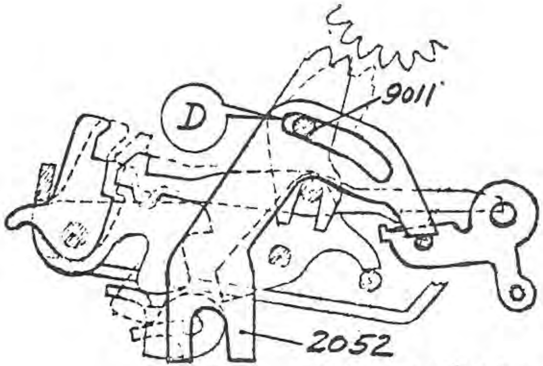
FIGURE - I

FIGURE - 2

66. ACCUMULATOR MESH

Machine normal, loosen the screw in the plate in lower end of Accumulator Section Actuator Hook (28-8037) (Ref. B, Fig. 2). By hand, push Accumulator into mesh with Transfer Racks and check to see that the stud in left end of Accumulator Carry Segment Assembly (28-9011) is not bottoming in slot of Accumulator Lock Bail Release Arm (28-2052)(Ref. D, Fig. 1)(Refer to Adj. 74). With no item in the List Unit or Recall Unit, depress Add Control Key, turn Mainshaft until Forward Stroke Actuator Bar is fully operated. At this time, with Duck Bills applied to right Accumulator Frame, exert pressure away from racks and toward racks. Slight clearance should be evident. Also, check left side in same manner. Adjustment should be made to tightest side. Tighten screw.

NOTE: If this adjustment is changed or Accumulator replaced after Adjustment 71 and 72, recheck Adjustment 71 and 72.



START OF CYCLE
MESHED WITH RACKS

FIG. 1.

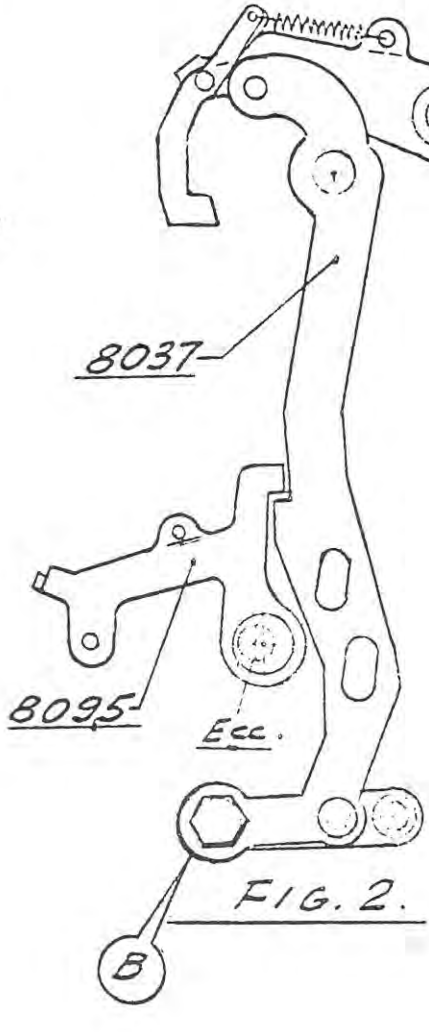


FIG. 2.

67. ACCUMULATOR CRADLE ARMS

Depress the Subtract Key, turn the Main Shaft until the Forward Stroke Bar is fully down and check the studs of the Wheel Section Side Plates to be .005 to .015 from the end of the Raceway Slots in the Wheel Section Actuator Arm Assembly (9007) (Ref. A, Fig. I). Adjust by twisting the Accumulator Section Subtract Actuator Yoke (2105).

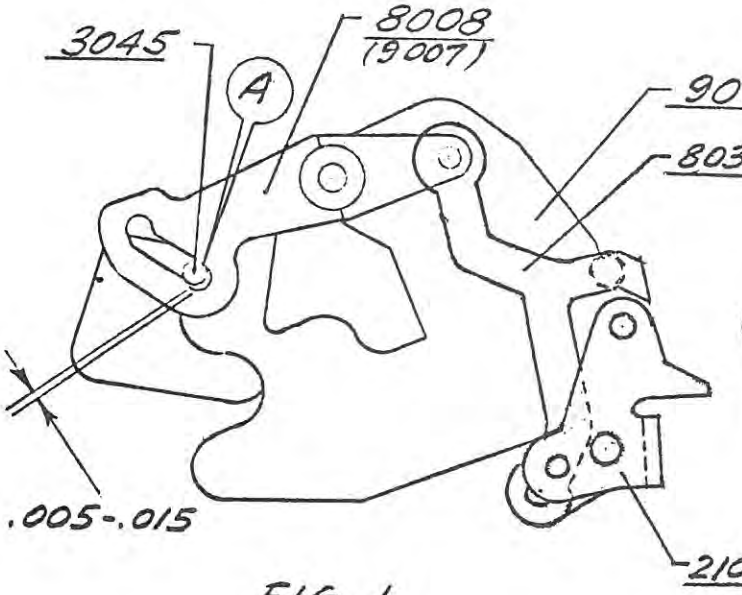


FIG. 1.

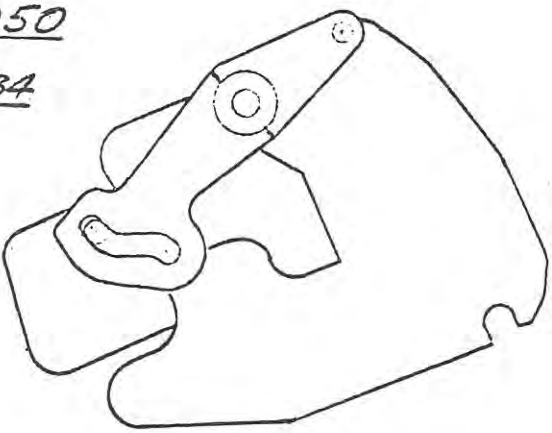
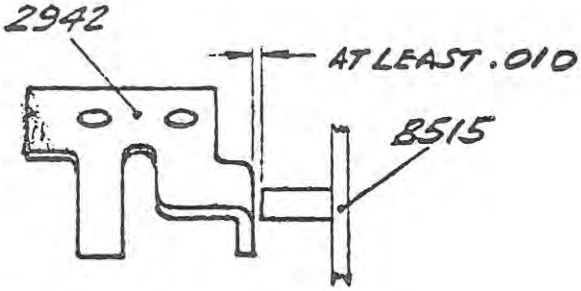


FIG. 2

68. TOTAL BAIL CONTROL

Align the Total Bail Control Stud Arm (8515) by moving it along the Total Bail Control Shaft (3703) so that the stud of the Arm will clear the side of the Total Bail Extension (2942) by at least .010 when the Total Slide (8520) is in normal position. Hold the Total Bail (2941) to the right when checking the clearance. (Refer to Adj. 70d and 70f.)

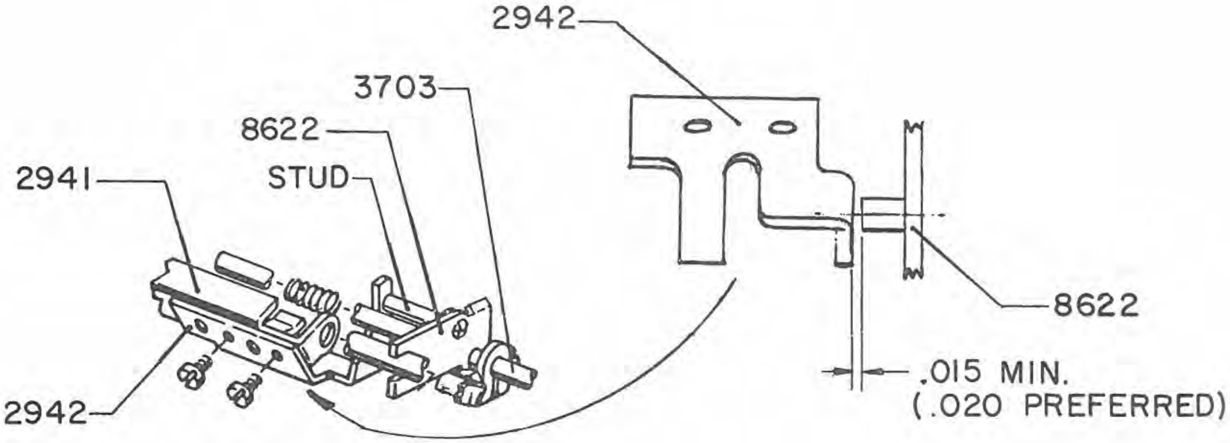


68. TOTAL BAIL CONTROL

With machine normal, hold the Accumulator engaged and to the right together with the Total Bail (2941).

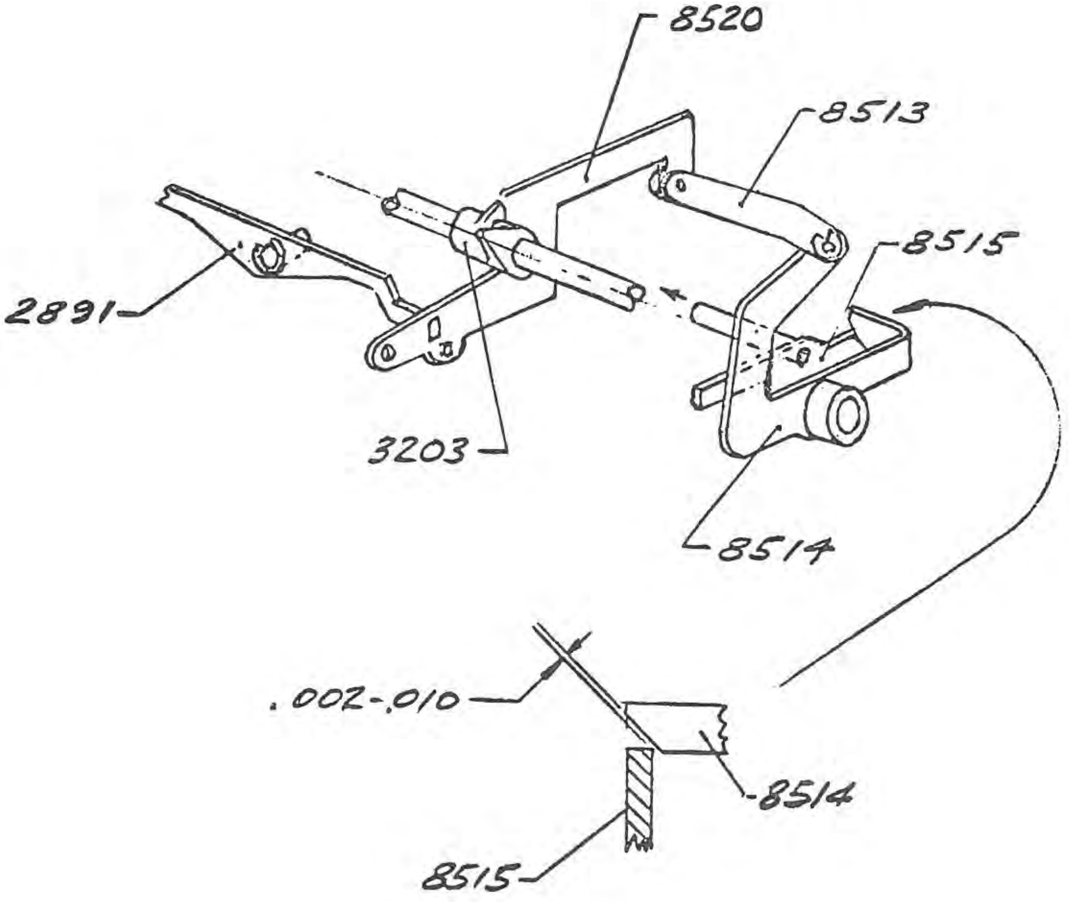
The stud on the Total Bail Control Stud Arm (8622) must clear the side of the Total Bail Extension (2942) by at least .015 (.020 preferred).

To adjust, loosen the Total Bail Control Stud Arm (8622) and position it on the Total Bail Control Shaft (3703) to suit the specifications and lock in place.



69. TOTAL BAIL CONTROL

Form the Total Bail Control Shaft Cam Lever (8514) to clear the Total Bail Control Stud Arm (8515) by .002 to .010 when Lever (8514) and Arm (8515) are held to the right.

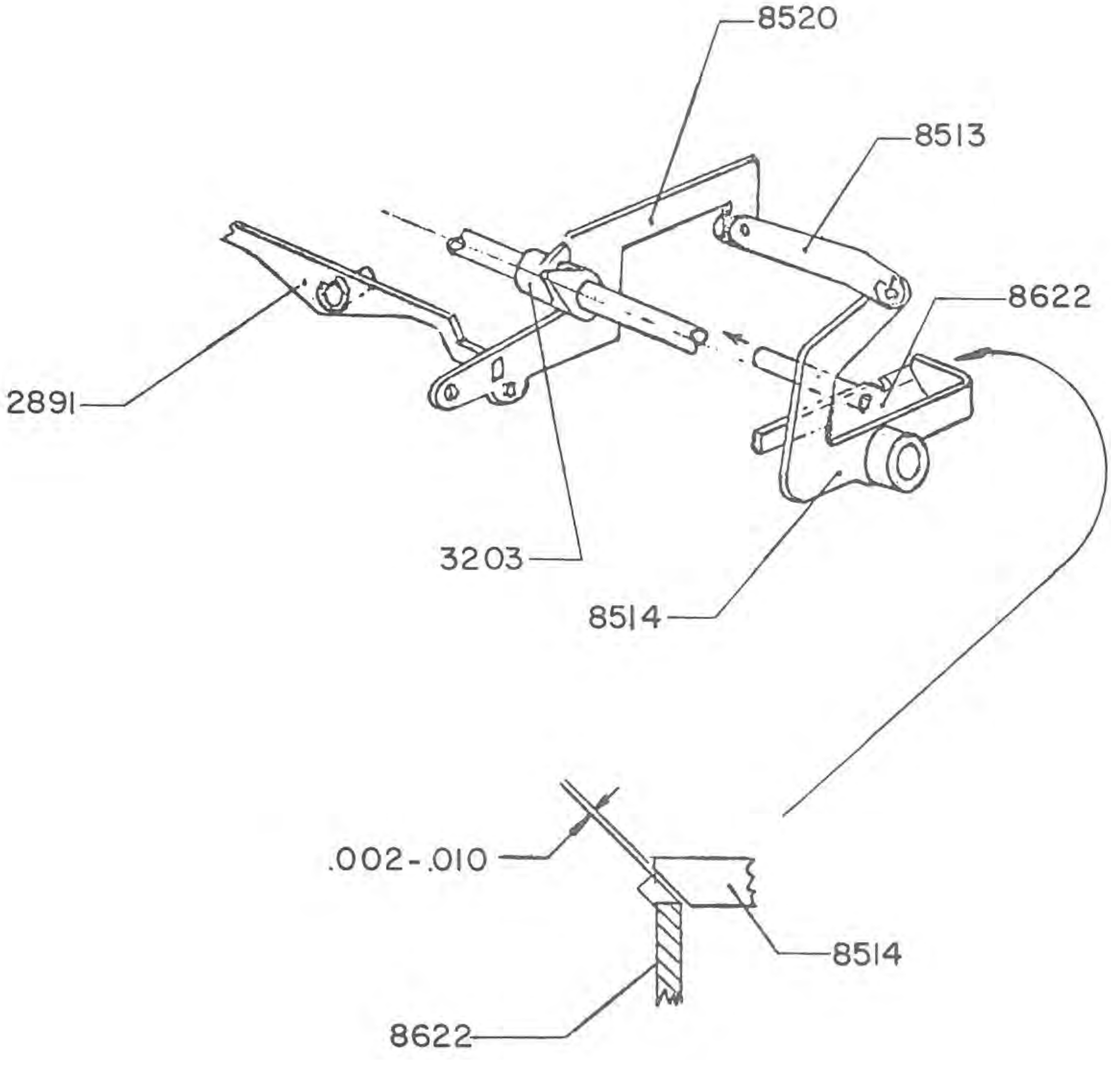


69. TOTAL BAIL CONTROL

Hold the Total Bail Control Shaft Cam Lever (8514) to the right lightly to take out play.

The Cam Lever (8514) must clear the Total Bail Control Stud Arm (8622) by .002 to .010.

Adjust by forming the Cam Lever (8514).



70. TOTAL BAIL CONTROL

a) With the Accumulator fully out of mesh, check for the stud on the Total Bail Control Stud Arm (8515) to clear the Total Bail Extension (2942) by at least .005. (Ref. Fig. 3). Adjust by forming the stop tail (Ref. B) on the Extension (2942). As the Accumulator is pushed slowly into mesh (manually) check for smooth action between the Extension (2942) and the stud on the Total Bail Control Stud Arm (8515). Excessive clearance will result in a binding action. On a carry operation, as the full tooth on the Add Gear (3003) trips the Carry Pawl (2059) be sure that there is no interference between the Pawl and the Total Bail (2941) (Ref. A. Fig. 2).

b) Depress the Total Key to move the stud of the Total Bail Control Stud Arm (8515) into position to actuate the Total Bail (2941) by means of the Total Bail Extension (2942) (Ref. Fig. 1). Turn the Main Shaft until the accumulator is fully in mesh with the Transfer Racks and check to see that the Total Bail (2941) holds the Carry Pawls (2059) in position without binding but with as little play as possible between them and the Add Gear (3003) hubs. (Ref. Fig. 2) Adjust by forming the outer tail on the Extension (2942).

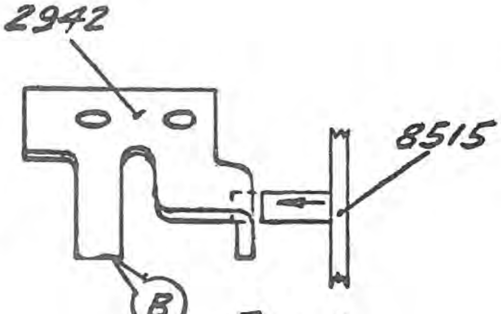


FIG. 1

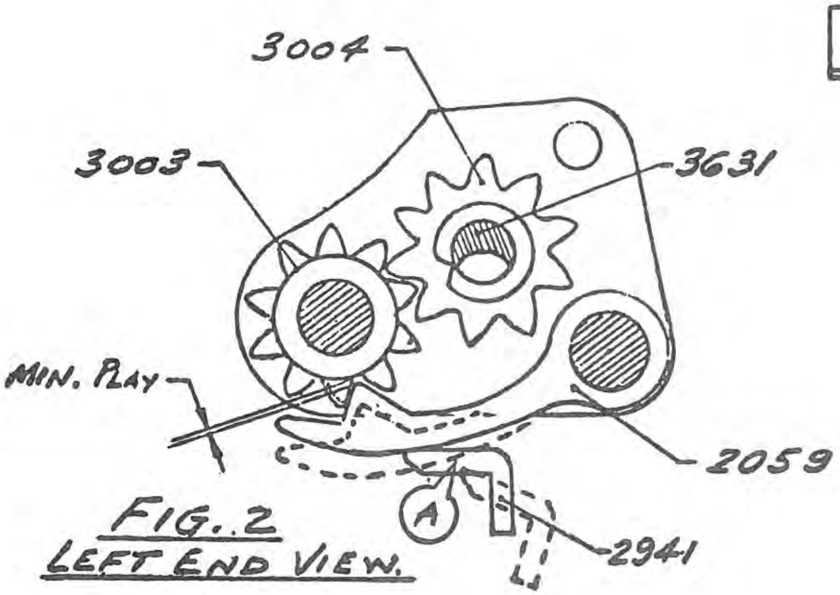


FIG. 2
LEFT END VIEW.

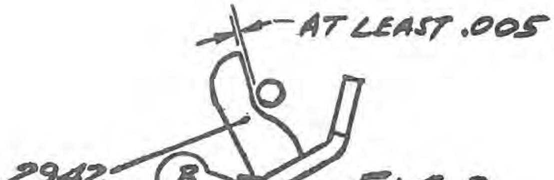
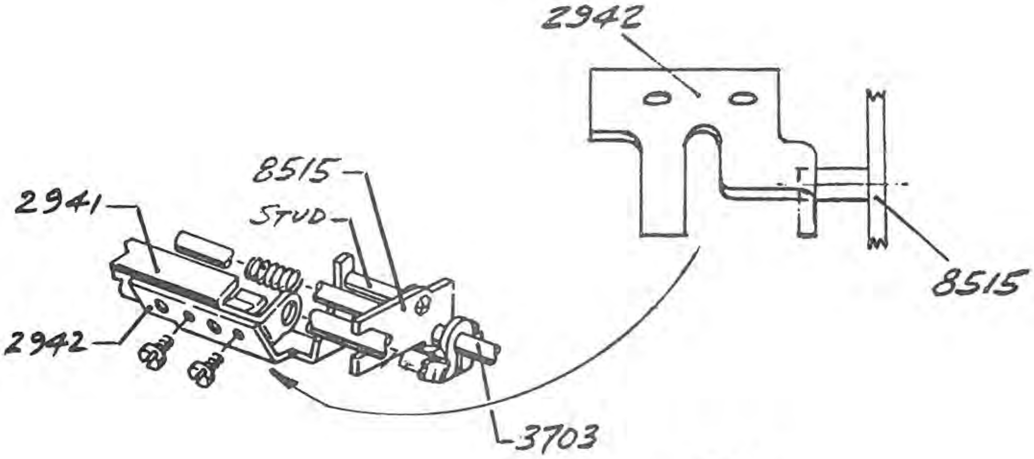


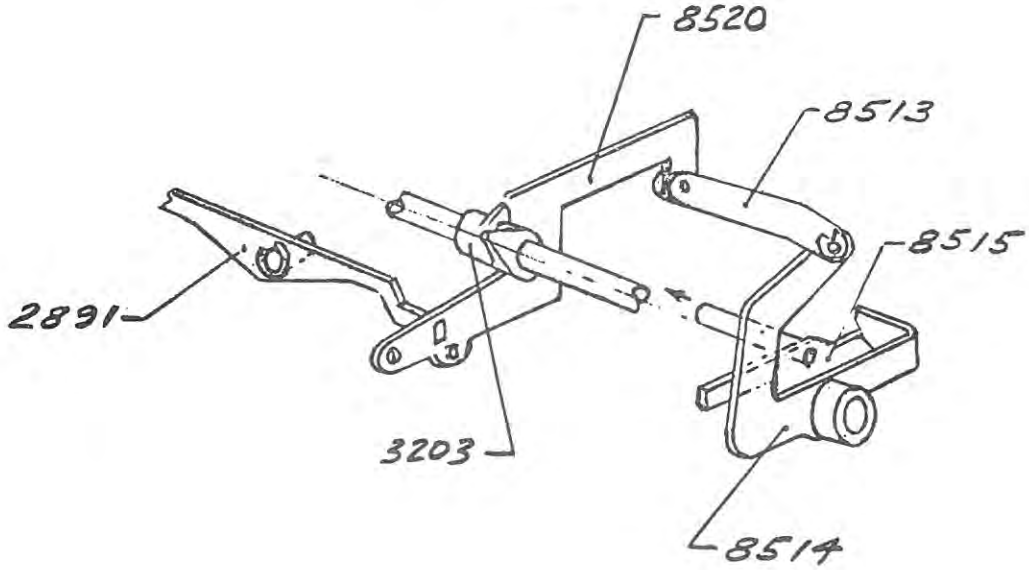
FIG. 3

70. TOTAL BAIL CONTROL

c) Depress the Total Key and check the Total Bail Control Shaft (3703) to have further movement to the left. The stud of the Control Stud Arm (8515) must have a full hold across the Extension (2942) when holding the Total Bail (2941) and the Accumulator to the left.

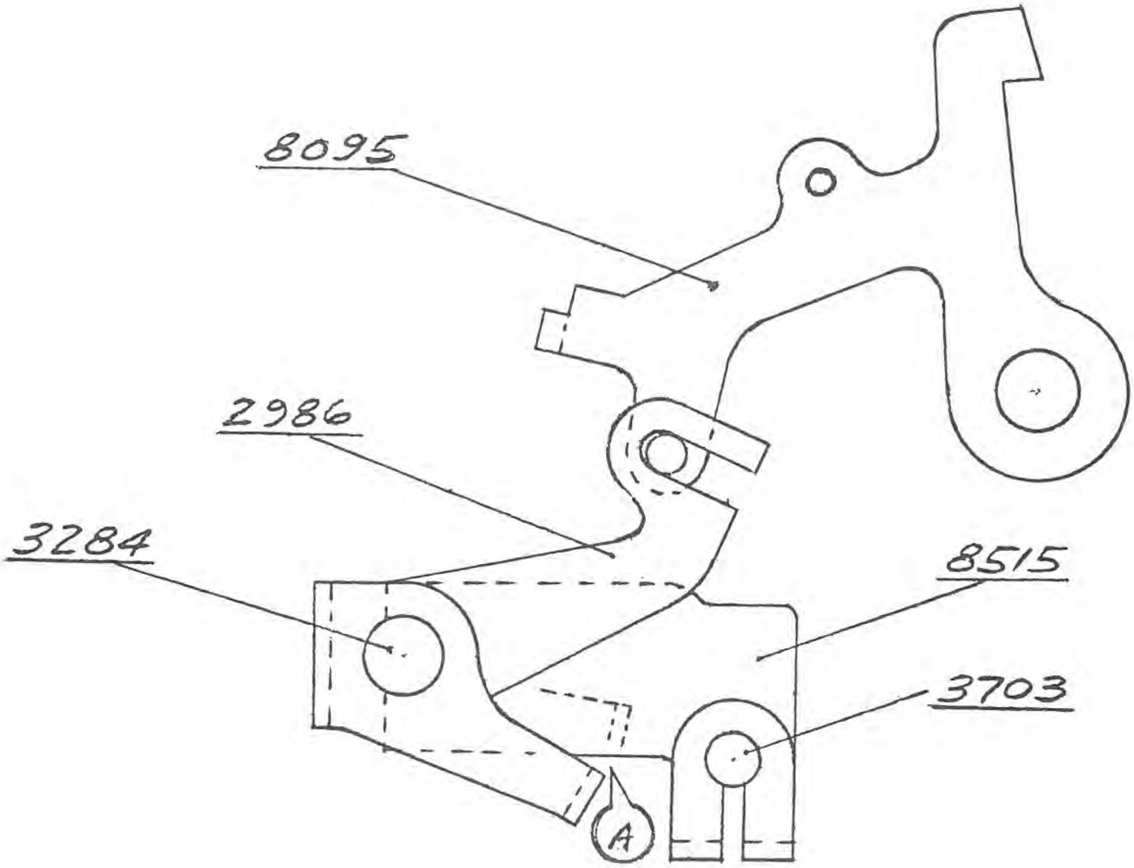
d) In multiplication, place the Universal Cam Shaft in 'D' position and check to see that the stud of the Control Stud Arm (8515) again has a good hold across the Total Bail Extension (2942) when holding the Total Bail (2941) to the left and the Control Stud Arm (8515) to the right.





70. TOTAL BAIL CONTROL STOP

e) With the machine normal, the Total Bail Control Stop (2986) must clear under the Total Bail Control Stud Arm (8515) (Ref. A).

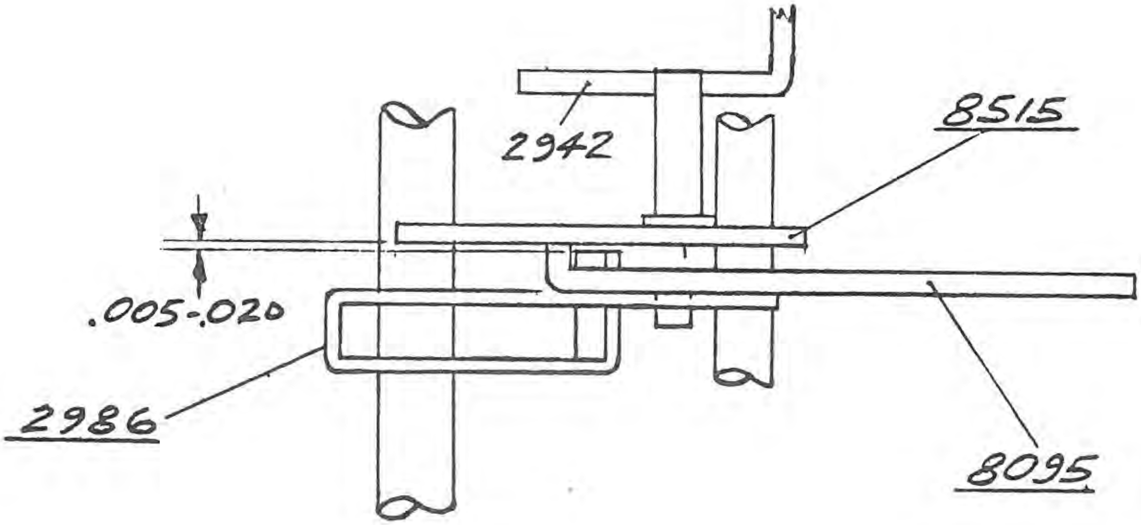


70. TOTAL BAIL CONTROL STOP

f) Depress the Sub-Total Key, turn the Main Shaft until the Accumulator is fully in mesh and the Accumulator Actuator Hook Latch (8095) has moved the Total Bail Control Stop (2986) into position to block the return of the Total Bail Control Stud Arm (8515) with .005 to .020 clearance. To adjust form the Total Bail Control Stop (2986). Hold (2986) to the left and (8515) to the right when making this check. (See also illustration for Adj. 70e).

g) Complete the cycle and check to see that as the Total Bail Control Stop (2986) blocks the Total Bail Control Stud Arm (8515), the stud in (8515) is still held in front of the Total Bail Extension (2942). Hold (8515) to the right when making this check.

h) With the Multiply Sub-Total Key ($\overset{\times\div}{\text{ST}}$) latched down, in Multiplication, and the Universal Cam Shaft in "D" position, see that the Total Bail Control Stop (2986) is free to drop in back of the Total Bail Control Stud Arm (8515).



70. TOTAL BAIL CONTROL

a) With the Accumulator fully out of mesh, the stud on the Total Bail Control Stud Arm (8622) must clear the Total Bail Extension (2942) by at least .005. (Ref. Fig.3).

Adjust by forming the stop tail (Ref. B) on the Extension (2942).

As the Accumulator is pushed slowly into mesh (manually) check for smooth action between the Extension (2942) and the stud on the Total Bail Control Stud Arm (8622). Excessive clearance will result in a binding action.

On a carry operation, as the full tooth on the Add Gear (3003) trips the Carry Pawl (2059) be sure that there is no interference between the Pawl and the Total Bail (2941) (Ref. A. Fig. 2).

b) Depress the Total Key to move the stud of the Total Bail Control Stud Arm (8622) into position to actuate the Total Bail (2941) by means of the attached Total Bail Extension (2942) (Ref. Fig. 1). Turn the Main Shaft until the Accumulator is fully in mesh with the Transfer Racks.

The Total Bail (2941) must hold the Carry Pawls (2059) in position without binding but with as little play as possible between them and the Add Gear (3003) hubs. (Ref. Fig. 2).

Adjust by forming the outer tail on the Extension (2942).

If forming adjustment is made, recheck Adj. 70a.

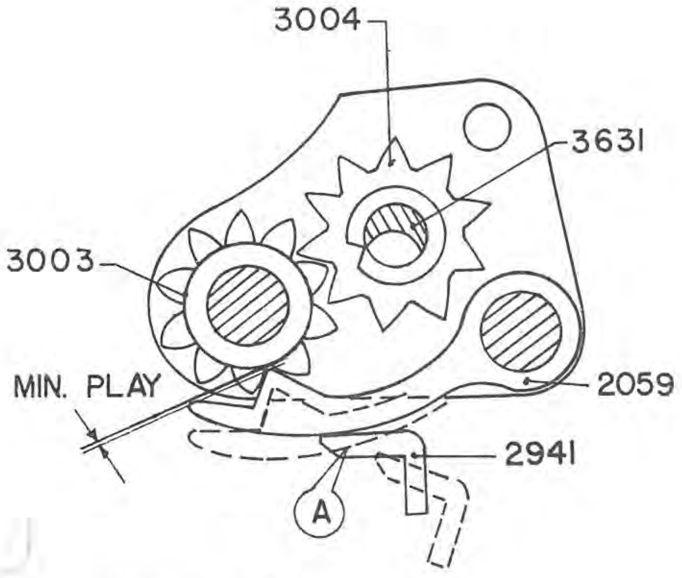


FIGURE 2
LEFT END VIEW

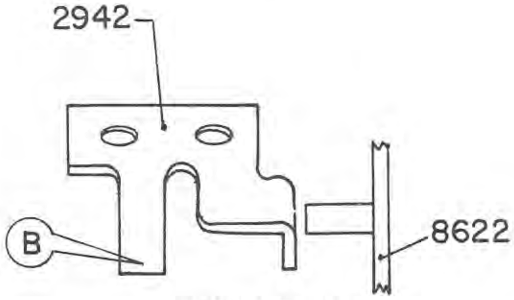


FIGURE 1

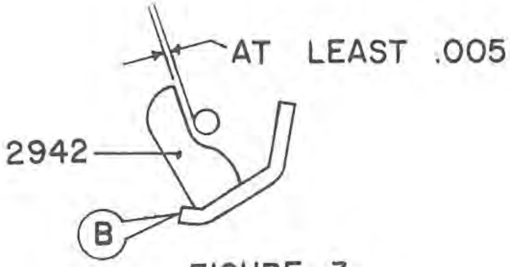


FIGURE 3

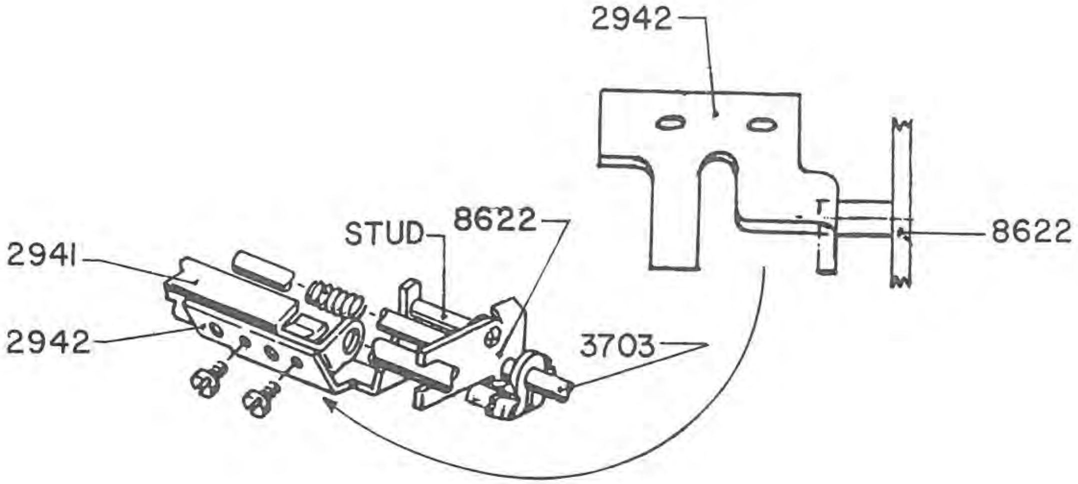
70. TOTAL BAIL CONTROL

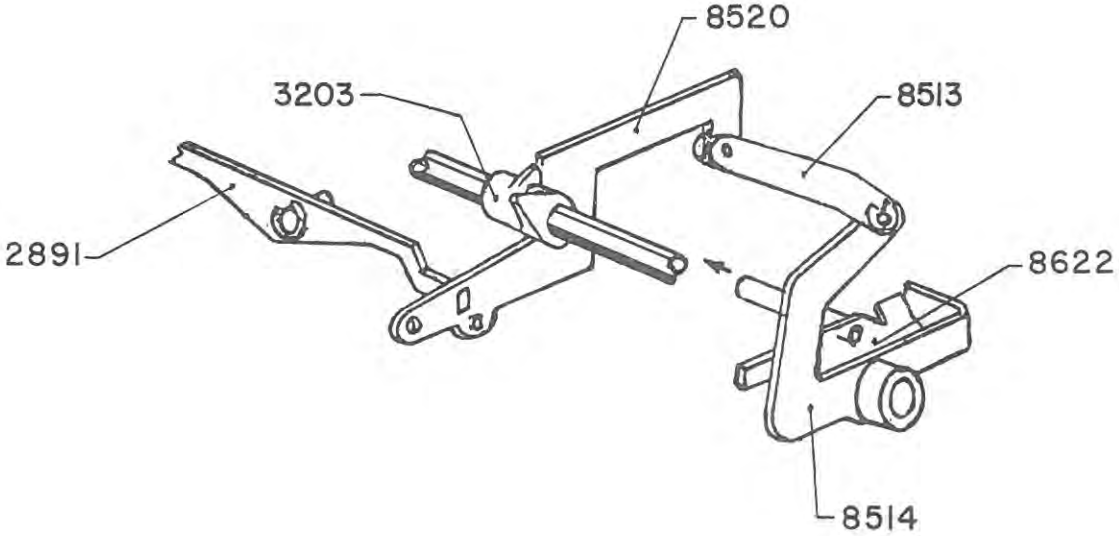
c) Depress the Total Key. The Total Bail Control Shaft (3703) must have further movement allowable to the left.

The stud of the Control Stud Arm (8622) must have a full hold across the Extension (2942) when holding the Total Bail (2941) and the Accumulator to the left.

d) In multiplication, with the Universal Cam Shaft in "D" position, the stud of the Control Stud Arm (8622) must again have a good hold across the Total Bail Extension (2942) when holding the Total Bail (2941) to the left and the Control Stud Arm (8622) to the right.

When these adjustments are made, recheck Adjustments (68) and (69).

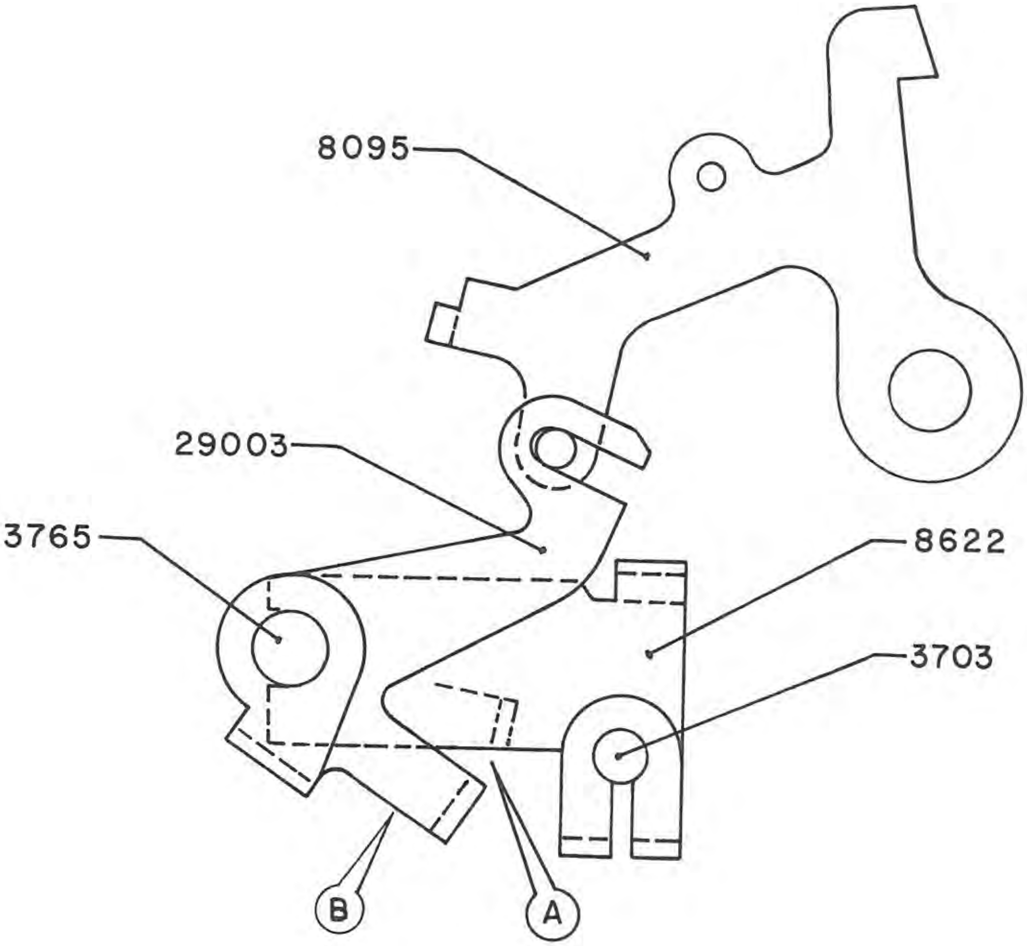




70. TOTAL BAIL CONTROL STOP

e) With the machine normal, the Total Bail Control Stop (29003) must clear under the Total Bail Control Stud Arm (8622) (Ref. A). Parts must be free.

Pein Extension (Ref. B)



70. TOTAL BAIL CONTROL STOP

f) With the Multiply Subtotal Key $\overset{X\div}{\text{(ST)}}$ latched down in multiplication, and the Universal Cam Shaft in "D" position, the Total Bail Control Stop (29003) must be free to drop in back of the Total Bail Control Stud Arm (8622).

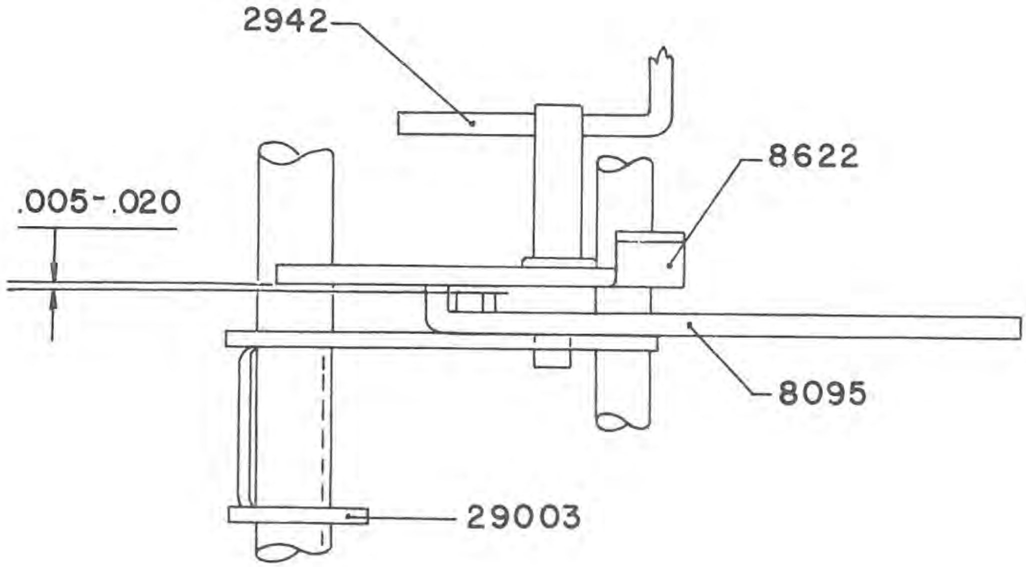
Hold the Control Stop (29003) lightly to the left to take out play when making this check.

The Control Stop (29003) must clear the Control Stud Arm (8622) by .005-.020.

To adjust, form the Control Stop (29003).

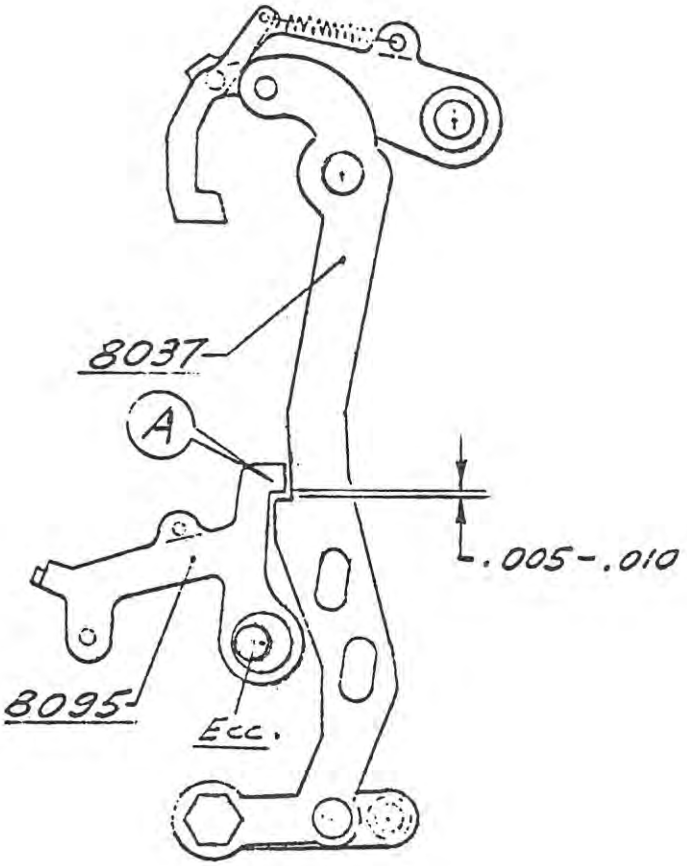
g) At the end of a subtotal operation, using the Subtotal Key, as the Total Bail Control Stop (29003) blocks the Total Bail Control Stud Arm (8622), the stud in (8622) must have a good hold across the Total Bail Extension (2942).

When this adjustment is made, recheck Adjustment (70f).



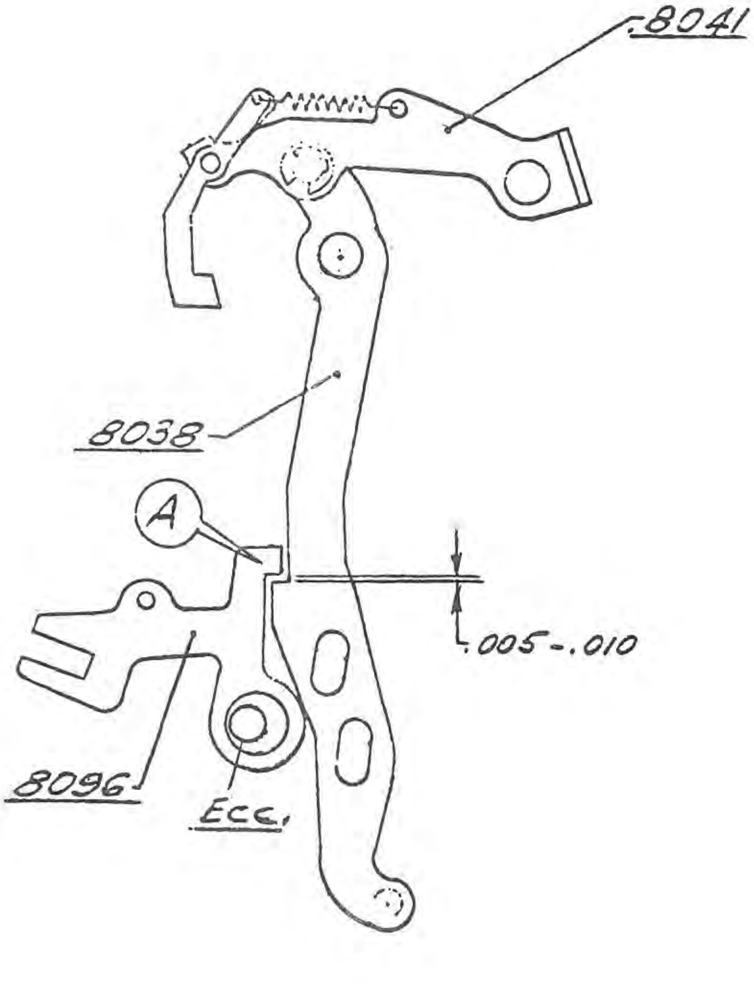
71. ACCUMULATOR ACTUATOR HOOK LATCH

Depress the Sub Total Key and see that as the Forward Stroke Actuator Bar (8036) is all the way down, the Accumulator Actuator Hook Latch (8095) latches the Accumulator Section Hook (8037) and is free to move in and out with .005 to .010 clearance (Ref. A). Adjustment made by the eccentric hub on Latch (8095).



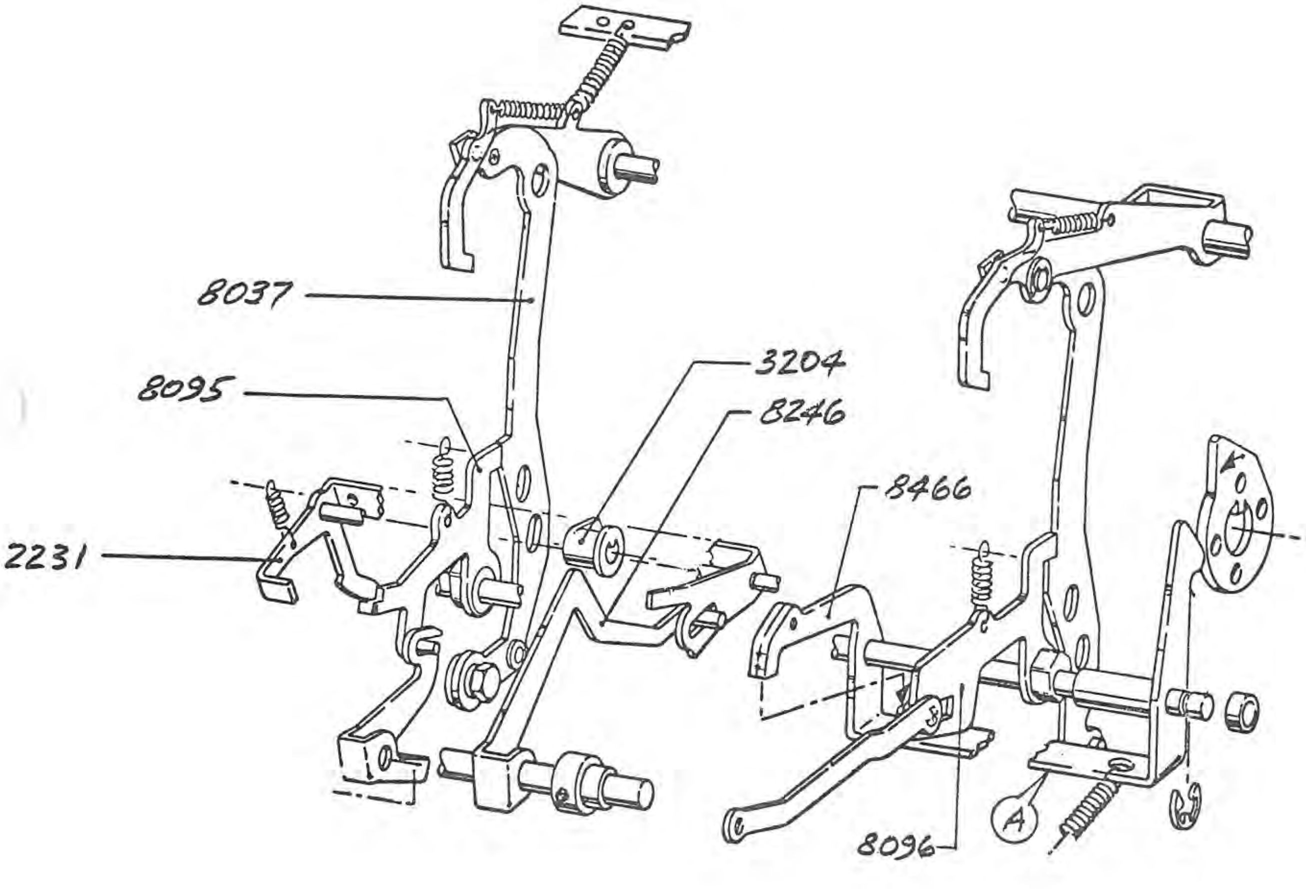
72. ACCUMULATOR SUBTRACT HOOK LATCH

Depress the Subtract Key, turn the Main Shaft with the Accumulator in mesh and check to see that the Forward Stroke Actuator Bar (8036) is all the way down, and see that the Accumulator Subtract Actuator Hook Latch (8096) is in the step of the Subtract Hook Latch Link (8038) and is free to drop in and out with .005 to .010 clearance (Ref. A). Adjustment made by the eccentric hub on Latch (8096).



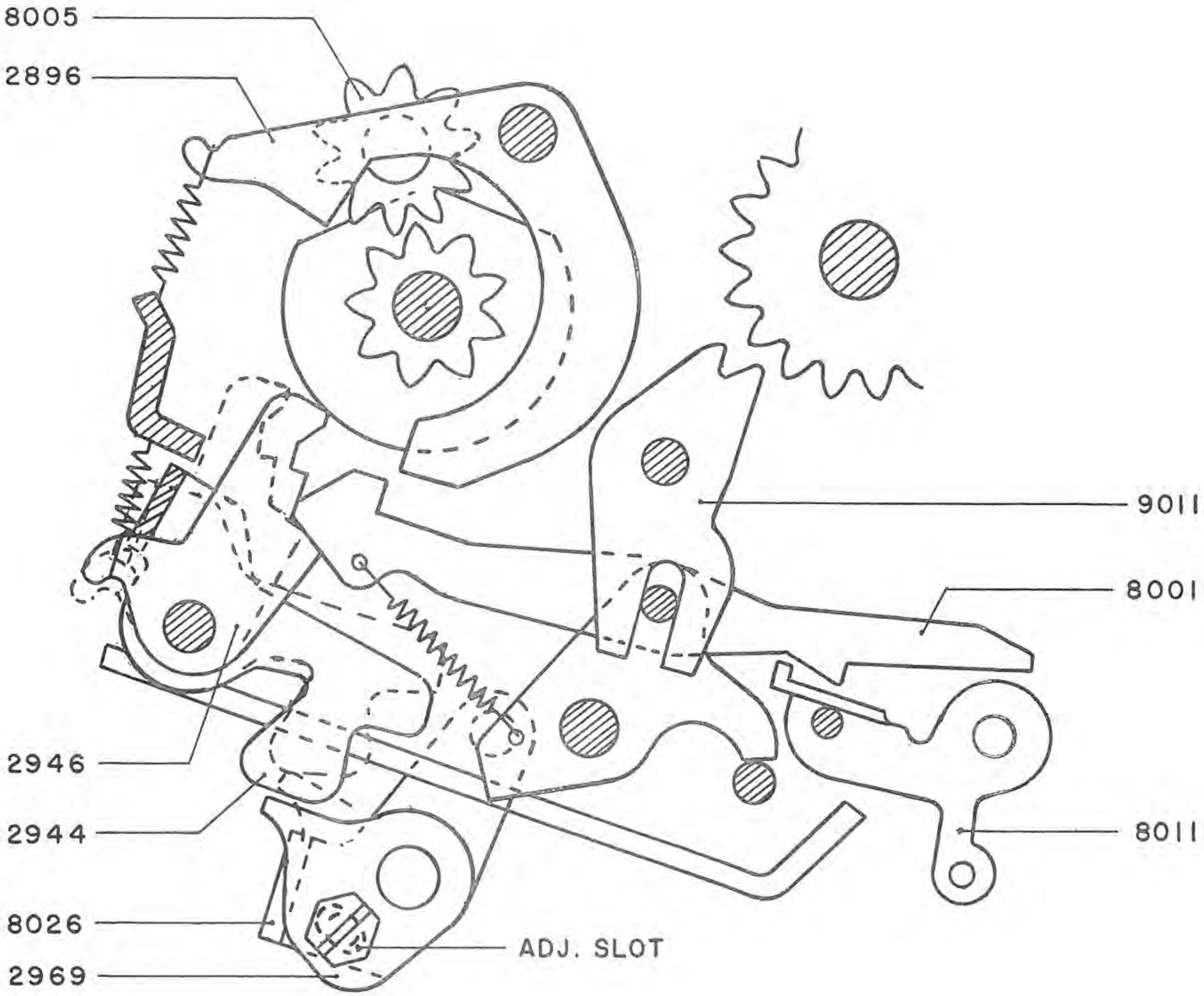
73. SUBTRACT CONTROL BAIL

Depress the Add Key (after Sub-Total operation), and as the Main Shaft is turned, check the Subtract Control Bail (8466) to release both the Accumulator Actuator Hook Latch (8095) and the Accumulator Subtract Actuator Hook Latch (8096) and have at least .020 further movement at A to assure sufficient latch clearance. For adjustment, twist the Subtract Control Bail (8466). The Bail must be free at all times and also have further movement allowable when on the high point of the cam.



74. ACCUMULATOR ACTUATOR LINK RELEASE

a) Cycle the machine manually until the Accumulator has just moved fully into mesh with the racks and the Accumulator Actuator Link Latch Release mechanism is still actuated. At this time, check for slight further allowable movement (not more than .020 at the point of contact between the Link Latch Release Blank (2969) and the Link Latch Release Bail (2944). To adjust, reposition the Release Blank (2969) on the Link Latch Release Yoke Assembly (8026).



74. ACCUMULATOR ACTUATOR LINK RELEASE

b) Subtract 1 from clear machine, then add 1. Depress the Subtract Key and, as the Accumulator moves into mesh, see that the studs of the Wheel Section Side Plates are safely in the Raceway dwells of the Wheel Section Actuator Arm Assembly (9007) before the Accumulator Lock Bail Release Arm (2052) releases the Actuator Links (8001). As the cycle continues there must be slight further movement of the Acutator Link Lock Bail (8011) (Ref. A, Fig. 2). Adjust through the Accumulator Lock Bail Adjusting Shaft (8105) in the Left Side Frame (Ref. C, Fig. 1).

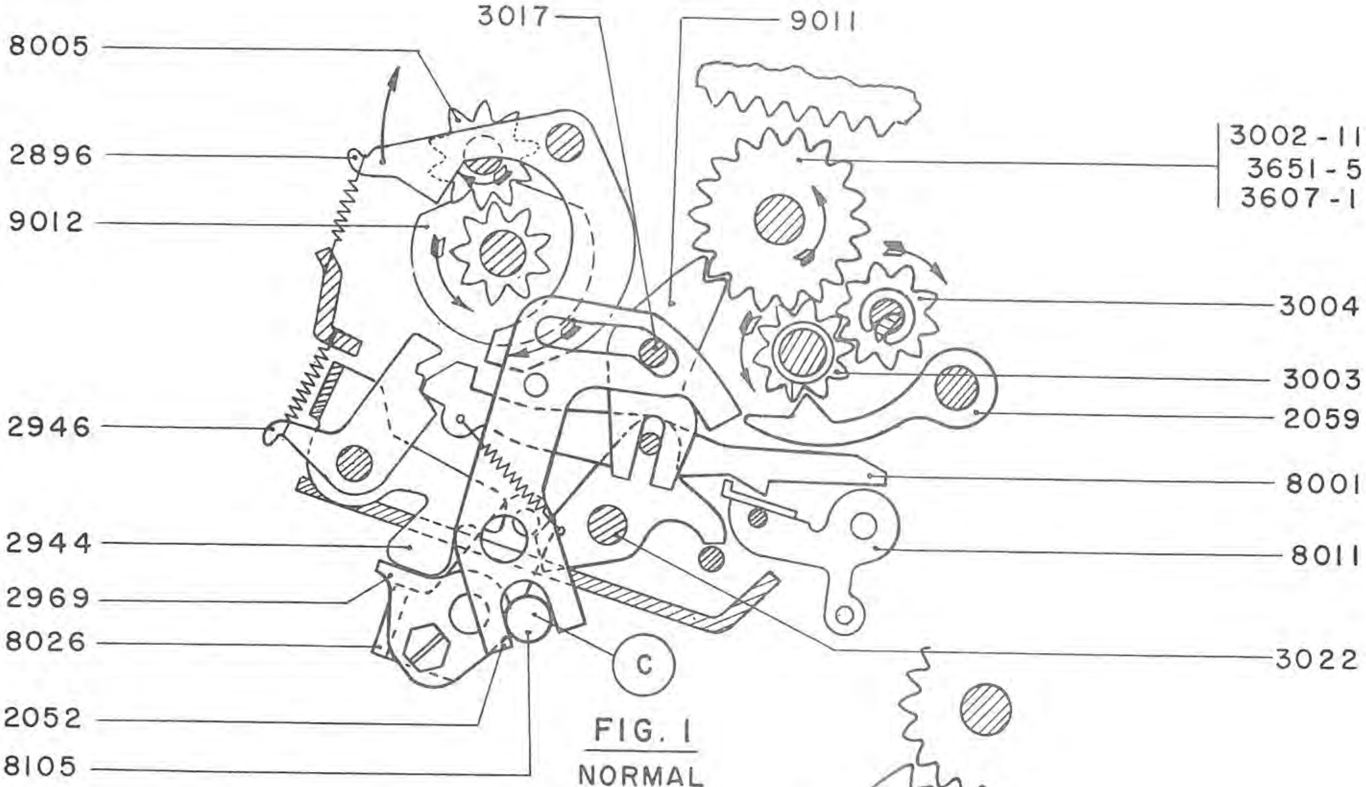


FIG. I
NORMAL

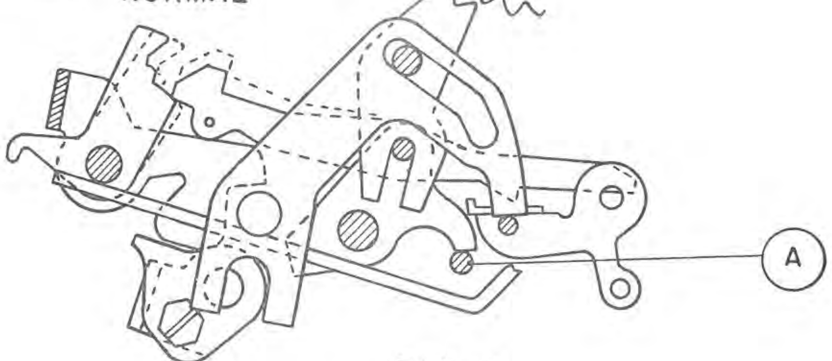


FIG. 2

75. ADD BACK

a) Place the Accumulator Wheels in the Add position and check to see that the Add Back Bail Actuator Slide (2047), on the last Actuator Link, clears the lip of the Add Back Actuator Bail (2314) by at least .010 while holding the Slide (2047) and the Accumulator to the left. (Ref. Fig 2). Adjust by forming the Add Back Actuator Bail (2314).

b) Place the wheels in Subtract position. See that the Add Back Control Bail Shaft (3237) is free to slide laterally. (Ref. Fig. 1). Then hold the Accumulator to the right and check to see that the Add Back Bail Actuator Slide (2047) fully aligns with the lip of the Add Back Actuator Bail (2314).

c) The end of the Slide must clear the lip by .010 - .020 when it is not in carry position. (Ref. Fig. 3). Adjust by twisting the Add Back Actuator Bail (2314).

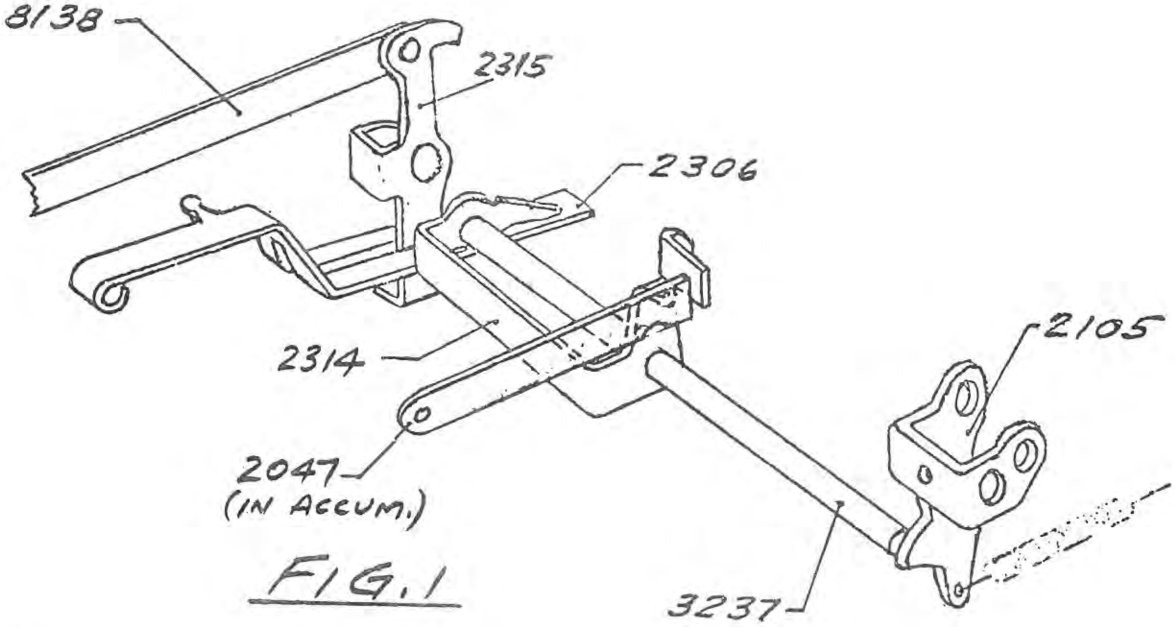


FIG. 1

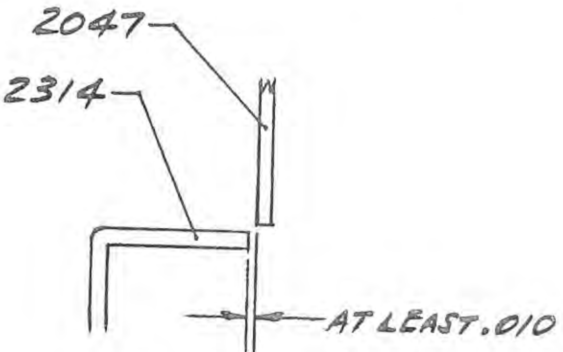


FIG. 2

BOTTOM VIEW

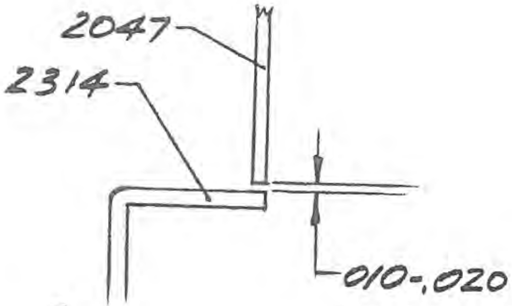


FIG. 3

76. ADD BACK CONTROL

a) With machine clear, the Division M & D Lift Mechanism Latch Control (2306) must clear the Division Add Back M & D Lift Latch (2315) by at least .010 (Ref. Fig. 1).

b) Subtract 1 from a clear Accumulator and check to see that the Add Back Bail Actuator Slide (2047) is pushing the Add Back Actuator Bail (2314) (Ref. Adj. 75). Continue to turn the Main Shaft to see that the Division M & D Lift Mechanism Latch Control (2306) hooks on the Division Add Back M & D Lift Latch (2315) with a full hold. Adjust by forming the long arm of the Division M & D Lift Mechanism Latch Control (2306) (Ref. Fig. 2 and Adj. 64B).

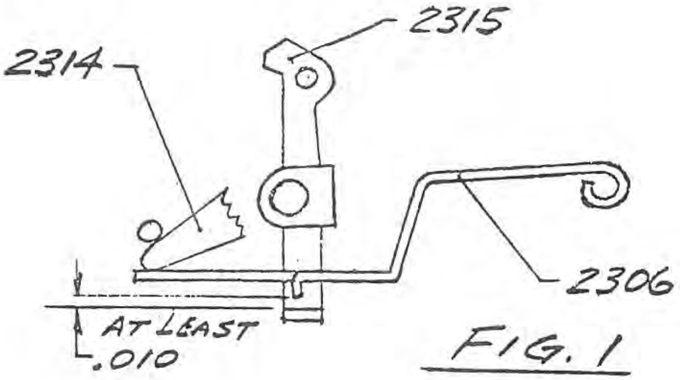


FIG. 1

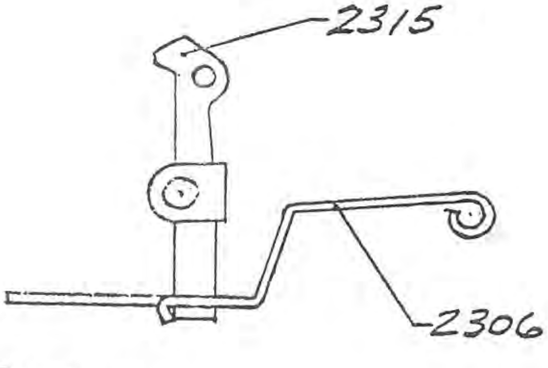
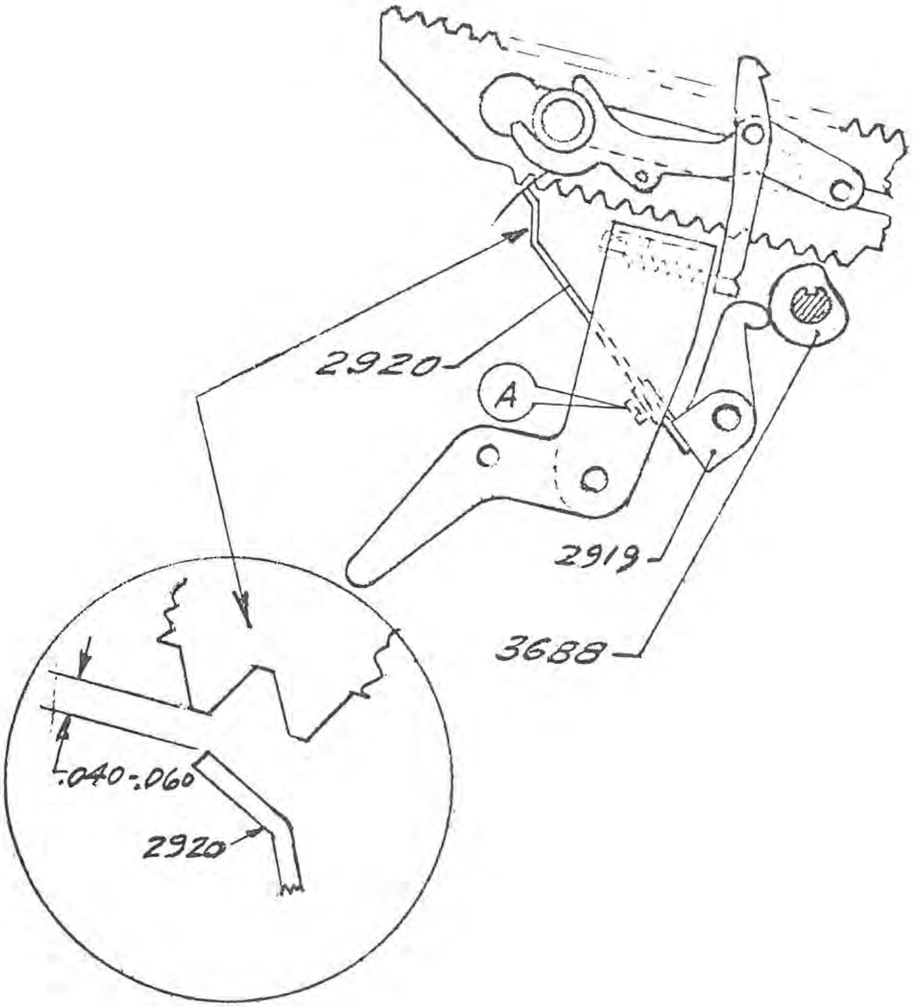


FIG. 2

77. RACK REBOUND PLATE

a) Read out sixteen 9's from the Accumulator - turn the Main Shaft slowly until the Drive from the Accumulator is completed; that is, the key has just snapped into its home position. At this point, the Rack Rebound Lock Plate (2920) must be located in the rack teeth with just enough clearance to allow it to drop in freely. Adjust through the adjustment slots in the Rack Rebound Plate (2920) (Ref. A.).

b) Check to see that the edge of the Rebound Plate (2920) clears the Racks by .040 - .060 in the disengaged position. Adjust by twisting the Rack Rebound Lock Bail (2919) at the Cam Follower.



78. SEVENTEENTH COLUMN LIMIT

With the List Unit all the way to the left (16 1/2 column position - gears between racks), adjust the List Unit Limit (2741) (Ref. Fig. 1) so that the Half Step Yoke (2472) does not bind when engaging Escapement Rack (2080) (Ref. Fig. 2).

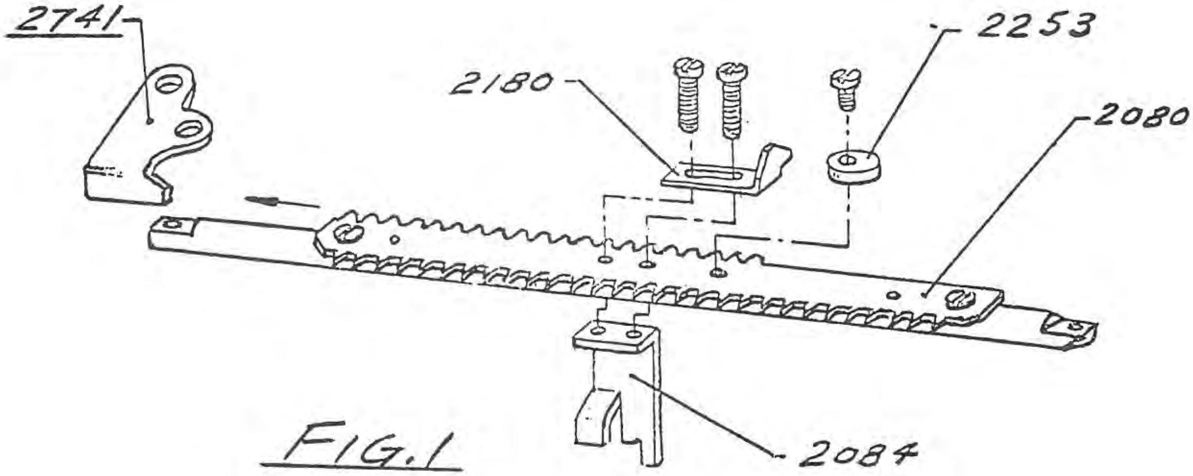


FIG. 1

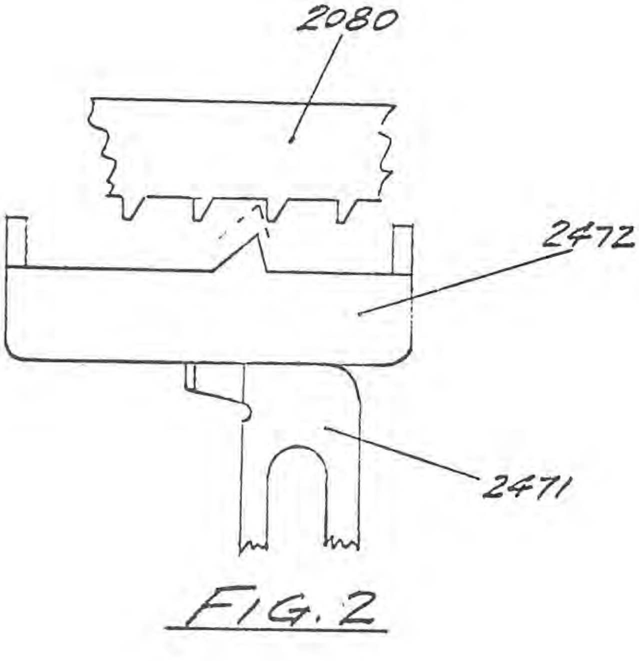


FIG. 2

79. SEVENTEENTH COLUMN LOCK

a) With the List Unit in the 16th column, the Multiply and Division Keys must depress without perceptible bind or catch. With either key depressed, check the 17th column Lock Arm (2822) to have very slight (.002-.005) play. This cannot be gauged so extreme caution must be used to keep play to a minimum. (Ref. Fig. 2). Adjustment is obtained by forming the Lock Arm (2822).

b) With the List Unit in the 16-1/2 column position, the Multiply and Division Keys must be solidly blocked.

c) With the Multiply Key depressed, the 17th Column Lock Arm (2822) must stop the List Unit at the 16th Column. To check this, depress the Multiply Key and actuate the Total Key Half Step Bail (8468) to move the List Unit 16 spaces to the left. As the Bail (8468) is actuated once more, slight further movement of the List Unit should be observed.

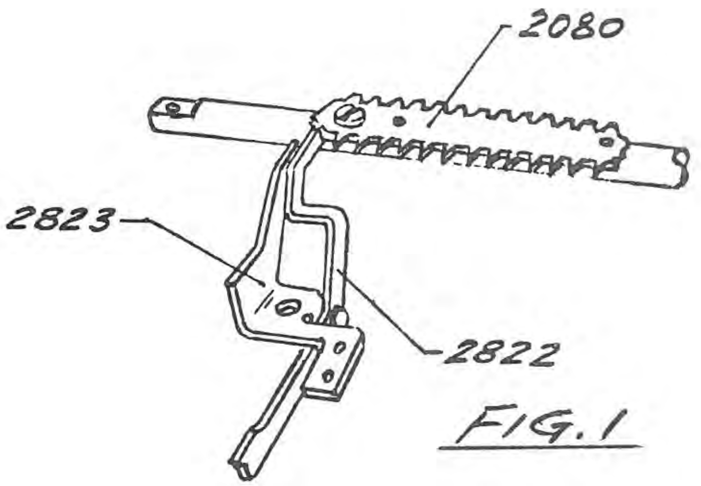


FIG. 1

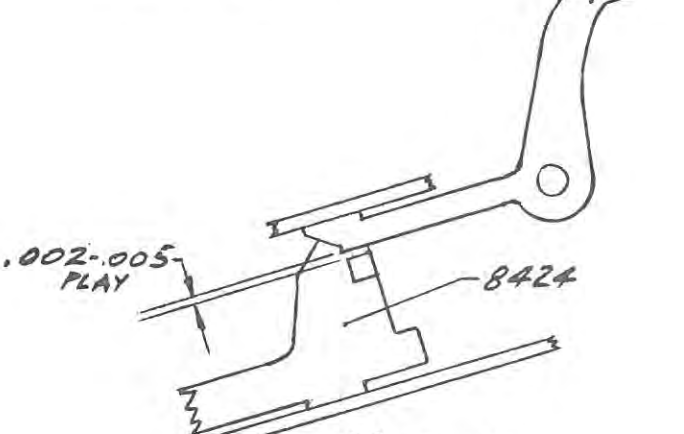


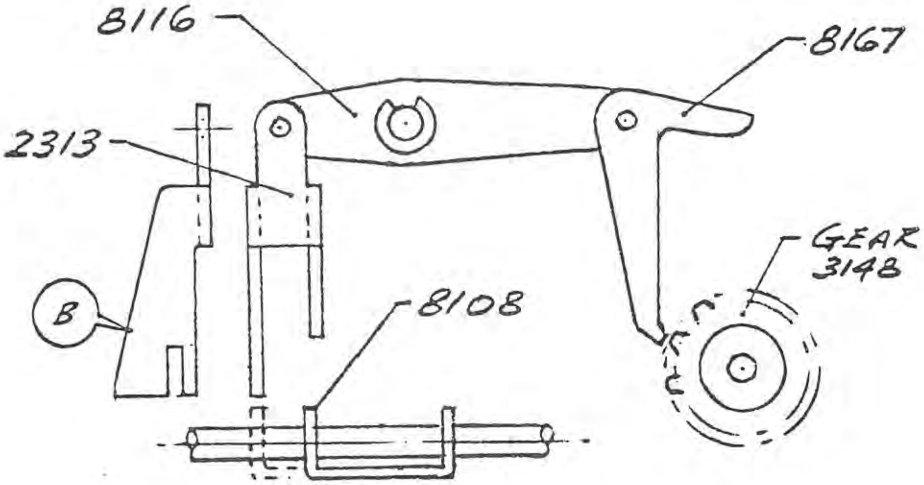
FIG. 2

80. BACK SPACE

a) With the Main Shaft in normal position, see that the Back Space Actuator Yoke Assembly (8108) is free laterally and clears the end of the Back Space Slide (2313).

b) In Division, at printing speed the Back Space Mechanism must operate effectively.

NOTE: If the back space movement is insufficient, peen the lower portion (Ref. B) of the left extension on the Back Space Slide (2313). After adjusting, recheck (a).

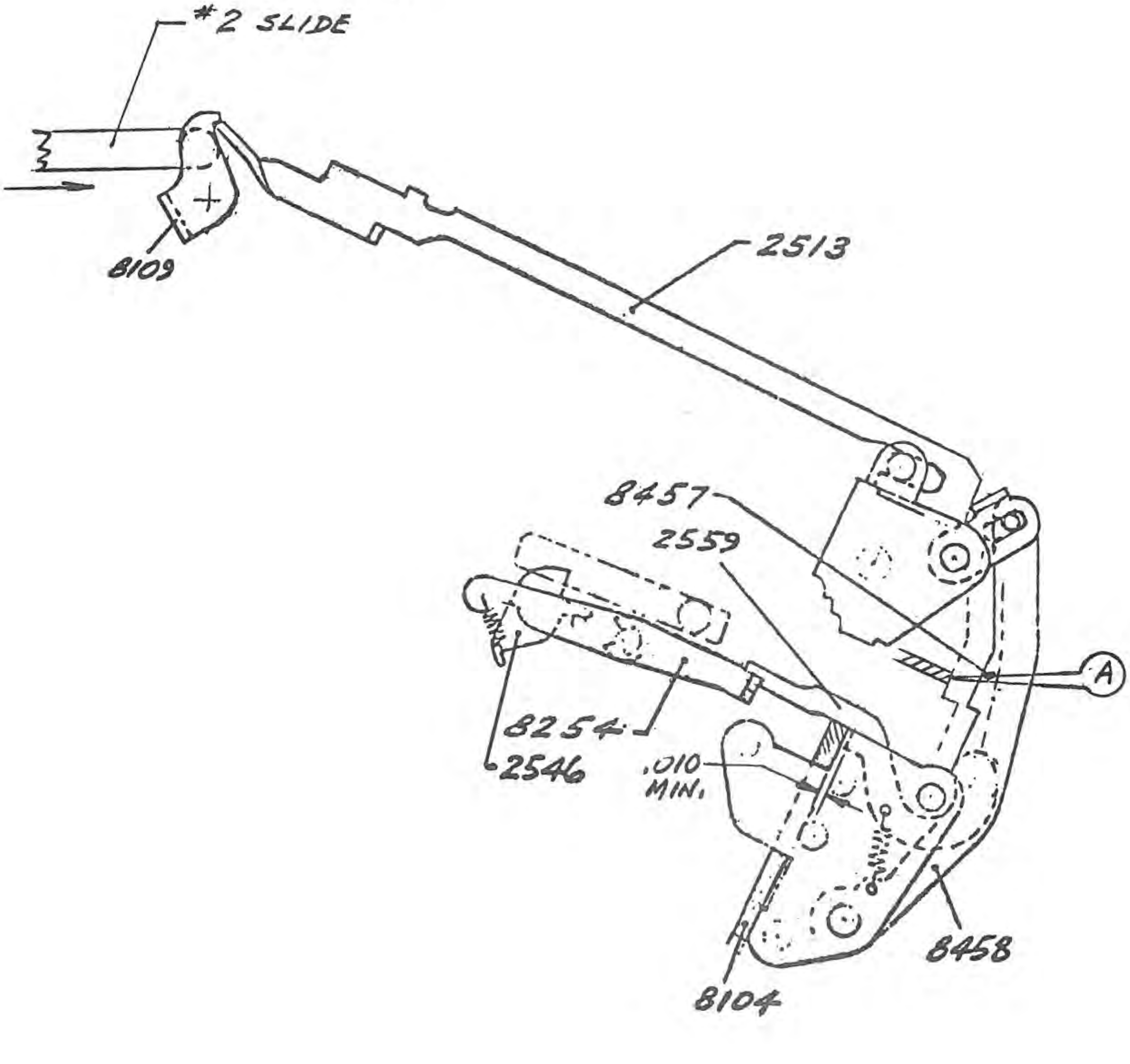


80. BACK SPACE - #2 SLIDE

c) In Division Back Space Operation, turning the Main Shaft by hand, check the Multiply List Unit Control Shaft Latch (2559) on the Multiply List Unit Control Shaft Latch Arm (8458) to be pulled at least .010 beyond the latch point on the Front Plate (8104). To adjust, form the Division List Unit Control Yoke (8109).

NOTE: There must be slight further movement allowable in the M & D Mechanism Drive Arm when the #2 Slide is actuated fully forward.

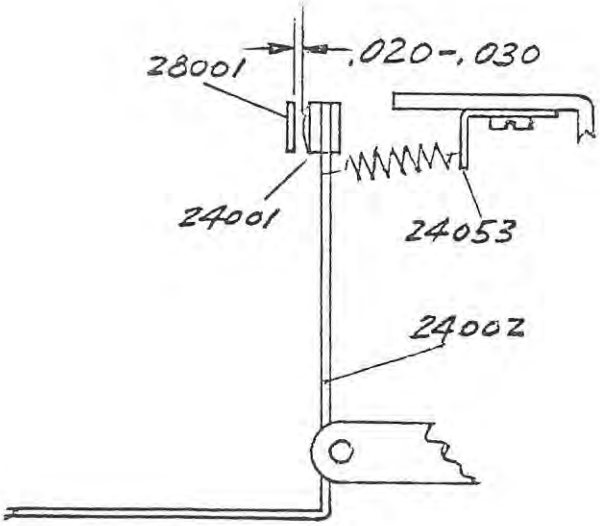
With machine normal, the Actuating Arm (8457) must be against the bottom plate of the keyboard (Ref. A).



81. SPEED (LOW) (PRINTING)

a) Check to see that there is .020 - .030 clearance between the Breaker Arm Insulator (24001) on the Contact Breaker Arm (24002) and the Governor Spring Contact (28001). (The spring tension on the Contact Points should be 3/4 to 1 ounce.)

b) Check the machine for printing or listing speed. It should be 195 ± 5 RPM. To check this, index a 2 in the keyboard, depress the Add Key then while holding the Continuous Running Slide (8085) on the left side of the keyboard depress the Add Key again and add for 30 seconds. Total indicates speed. To adjust, shift or form the spring bracket (24053) in the Motor Unit Assembly to change the spring tension on the Contact Breaker Arm (24002). Increasing the spring tension increases the speed.



82. SPEED (HIGH)

a) Form the tail on the Contact Breaker Arm (24002) to give .090 - .120 clearance between it and the High Speed Control Lever (8308) (Ref. Fig. 2).

b) The high speed should be 265 ± 3 RPM. To check this, divide 300 by 001 for 60 seconds. Stop with the Stop Key. Deduct the remainder from 300 to derive high speed. To adjust, change the spring tension through the movable Spring Clamp (2785) on Control Lever (8308). (Ref. Fig. 1). Increasing the spring tension increases the speed.

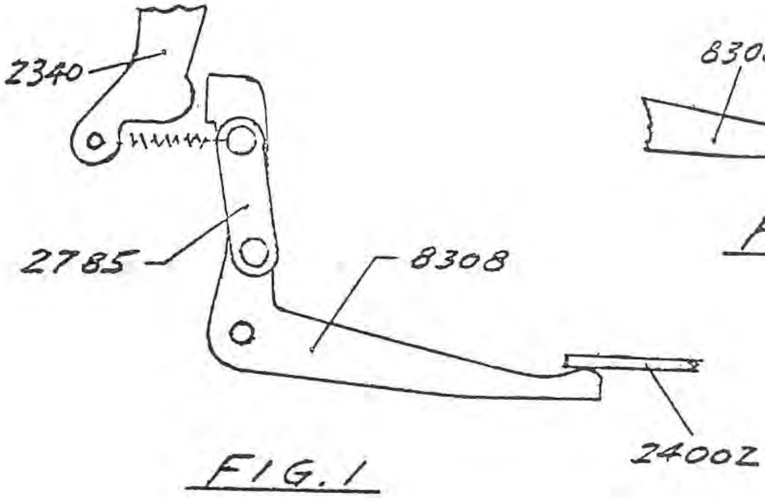


FIG. 1

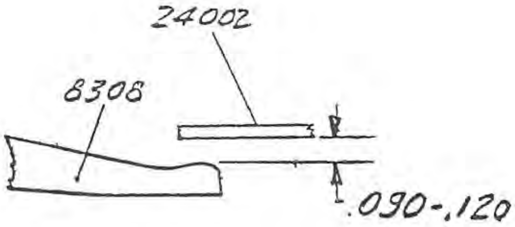


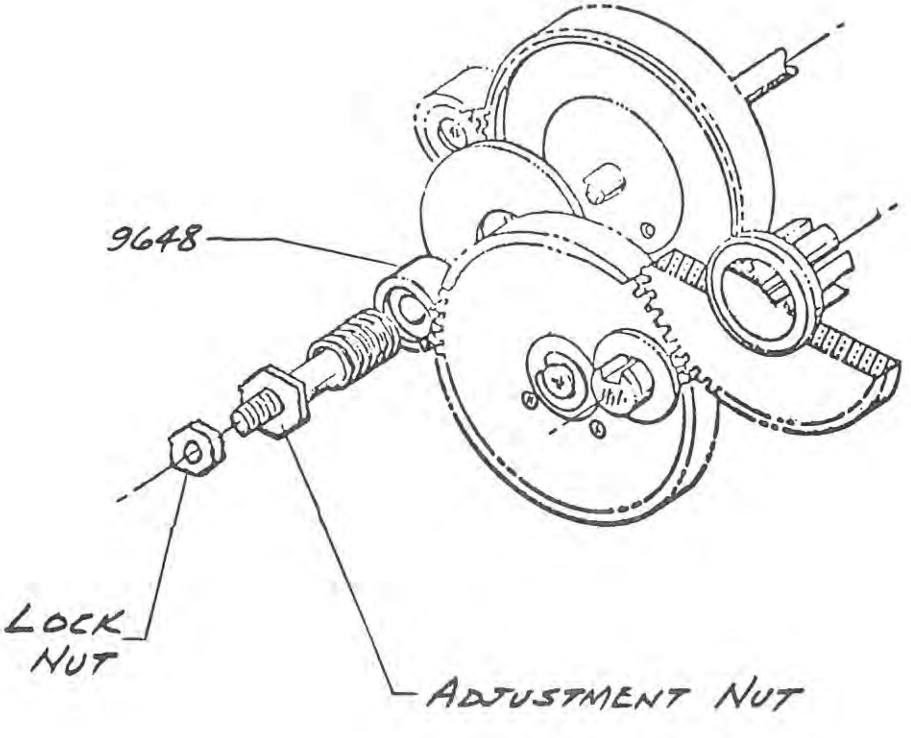
FIG. 2

83. SLIP CLUTCH ADJUSTMENT

The clutch faces should be wiped with an Ideal C oil wetted cloth to leave only a thin film.

Tighten the Adjustment Nut in the Slip Clutch Drive Assembly (9648) until the machine pulls through the problem of subtracting a full capacity of 2's followed by subtraction of a full capacity of 8's. Total and repeat problem several times.

The clutch must slip and feel close to stall point if the hand knob is held to prevent machine from cycling. After the proper setting is made, tighten the lock nut to retain the adjustment, and recheck.

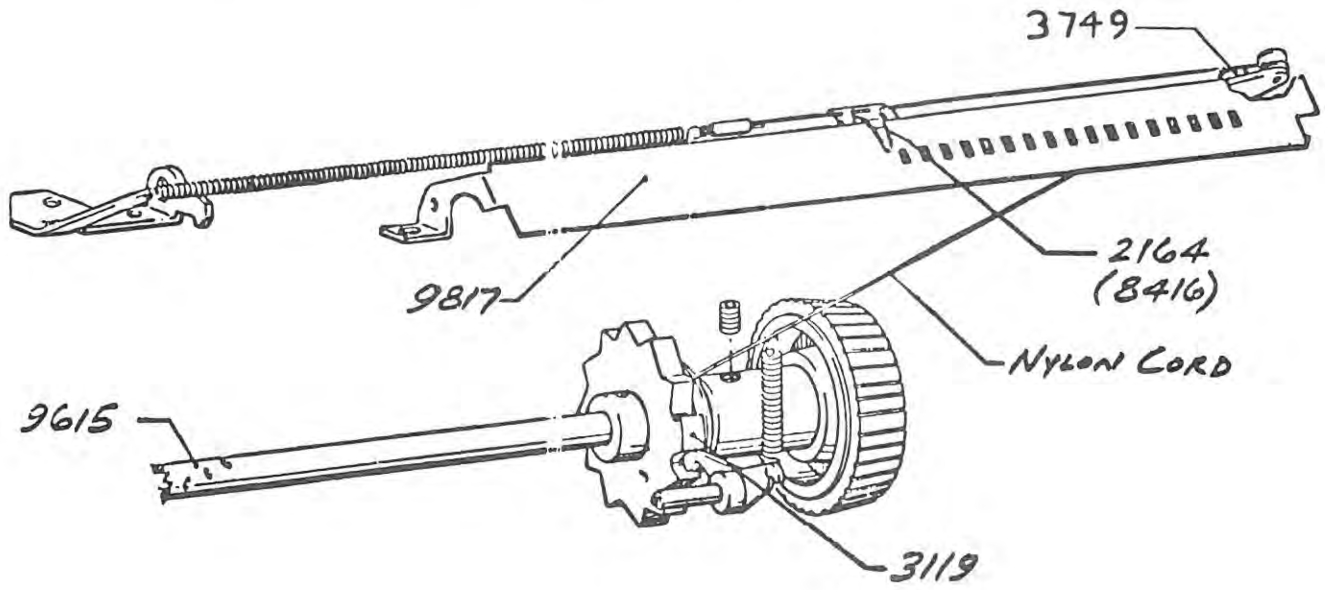


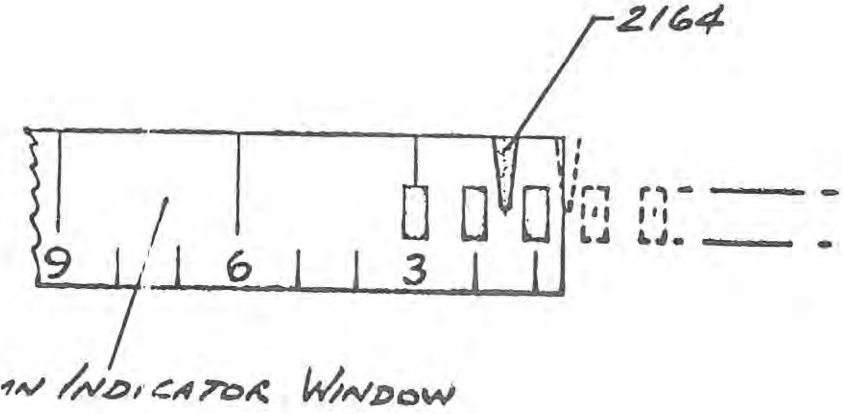
84. COLUMN AND DECIMAL INDICATOR

a) The Column Indicator Plate (9817) should be positioned so that indicator markings are centered on the Column Indicator Window positions as figures are indexed into the keyboard. The Indicator Plate (9817) is slotted for adjustment to the right or left. Check each column.

b) The Decimal Indicator Finger (2164) in Assembly (8416) should be positioned so as to locate between the indicator markings at each detented position of the Decimal Control Shaft. Check each column. Adjust by relocating the knot on the nylon cord (wound clockwise on the Detent Pulley (3119) or by repositioning the Indicator Plate (9817).

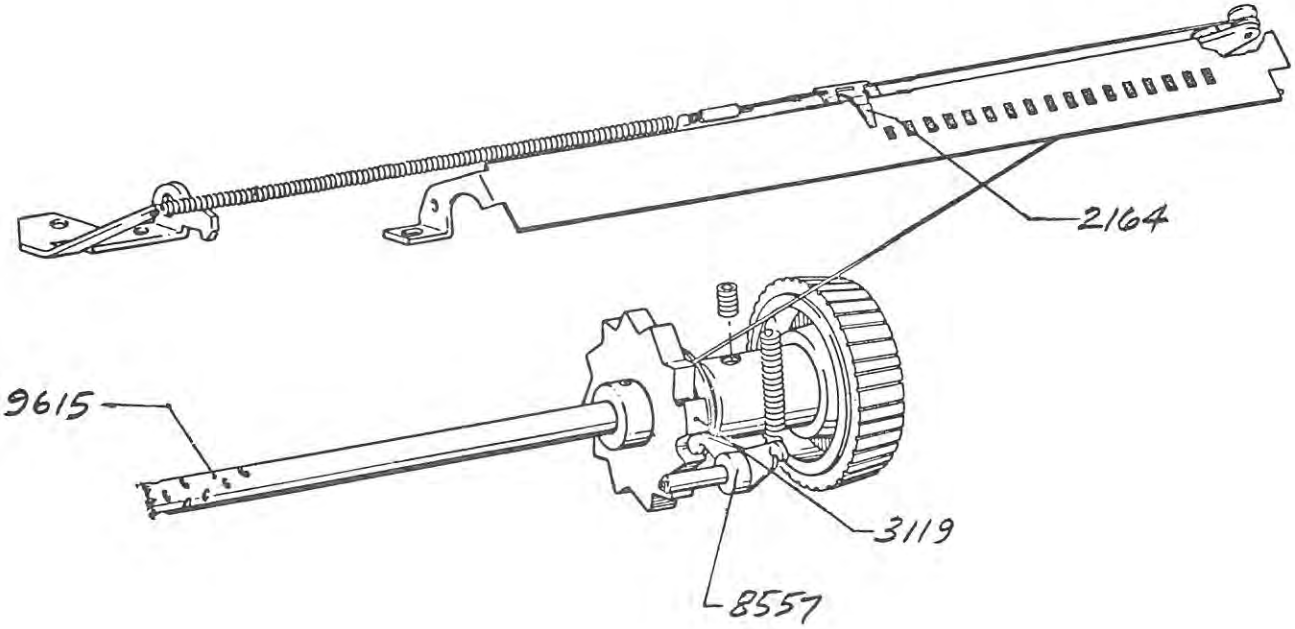
For fine positioning of the Decimal Indicator Finger (2164), adjust by rotating the Eccentric (3749).

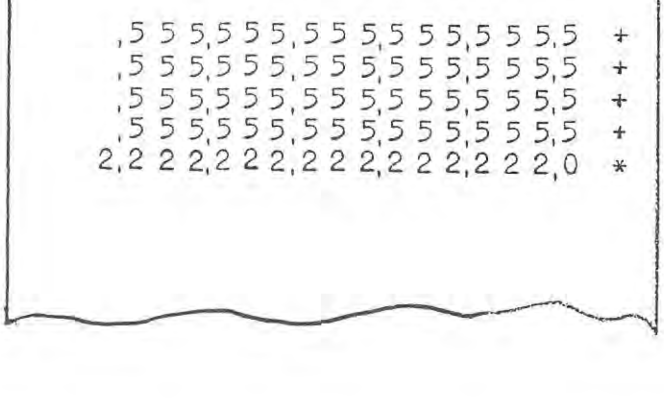




85. DECIMAL PRINTING

Turn the Decimal Indicator Detent Pulley (3119) counter clockwise until it limits on the Detent (8557). Then turn it one detented position clockwise and check for decimal print to the left of the 1st, 4th, 7th, 10th, 13th and 16th columns. Additional tooth ratcheting should give decimal print one column further to the left.





```
 ,5 5 5,5 5 5,5 5 5,5 5 5,5 5 5,5  +
 ,5 5 5,5 5 5,5 5 5,5 5 5,5 5 5,5  +
 ,5 5 5,5 5 5,5 5 5,5 5 5,5 5 5,5  +
 ,5 5 5,5 5 5,5 5 5,5 5 5,5 5 5,5  +
2,2 2 2,2 2 2,2 2 2,2 2 2,2 2 2,0  *
```

86. PAPER CUTTER

a) The lower edge of the Paper Cutter (4032) should be parallel to a full capacity of printed figures and must not interfere with normal line of sight. The vertical ribs on the cutter should be located between the figures. Adjust by repositioning the Paper Cutter.

b) On a cased machine, check for clearance between the case and the Paper Cutter to permit proper paper feed.